NEWSPAPER

# *DPers and Management: Three Views*

**By Brad Schultz**
CW Staff

NEW ORLEANS — DP professionals must overcome a serious image problem if they aspire to top corporate positions, a session of the 1978 Data Processing Management Association (DPMA) conference was told here last week.

"Many of us are considered overhead — the department that spends," Joseph I. Simone told the session entitled "From Data Processing Into Management — the Importance in Being Cost Effective." The comments of Decision Data Computer Corp.'s

*(Continued on Page 6)*

**By Marcy Rosenberg**
CW Staff

NEW ORLEANS — For the DP manager the times they may be a changin.

DP managers are now penetrating the senior levels of their organizations, according to Irwin J. Sitkin, vice president of corporate DP and administrative services for Aetna Life & Casualty Co. and this year's Data Processing Management Association (DPMA) man of the year.

Sitkin, who manages one of the largest DP installations in the country, joined Aetna in 1954 as an IBM supervisory clerk. In 1960

*(Continued on Page 6)*

**By Brad Schultz**
CW Staff

NEW ORLEANS — Today's DP manager should not feel limited to a technically oriented career path. In fact, the DP manager can attain the highest corporate positions, according to speakers at a session of the 1978 Data Processing Management Association (DPMA) conference here last week.

*More DPMA coverage on Pages 10, 12*

An individual needs intelligence most of all

*(Continued on Page 6)*

# COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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## *Donald Duck Cleans Up In HUD Audit*

**By Marcy Rosenberg**
CW Staff

WASHINGTON — While Donald Duck may not be able to slip past the Federal Bureau of Investigation, he was more successful at the Department of Housing and Urban Development (HUD) recently when the agency's supposedly safeguarded IBM 7074 issued him a $99,000 paycheck.

In what was referred to as the "Walt Disney Affair," Donald's name and those of 29 other cartoon characters were added to HUD's payroll by the General Accounting Office (GAO), watchdog over federal spending, as part of an audit check.

GAO disclosed the incident in testimony before the Subcommittee on Compensation and Employee Benefits of the House Post Office and Civil Service Committee. The subcommittee is investigating possible abuses of federal overtime pay which totalled $1.5 billion for the last fiscal year, $300 million more than for the previous year.

The 30 fictitious names were placed on the HUD payroll system to determine whether an employee skilled in computer manipulations could defraud the government, according to John J. Cronin, assistant GAO director.

"We ran the experiment on the HUD computer on off hours at night," Cronin said. "HUD authorized the computer time for us and helped us duplicate some of its files on a minimaster file. We did not play with its live files, so no checks were actually issued. However, the computer accepted all transactions and computed net pay."

*(Continued on Page 8)*

### *CW Poll Reveals*

## DP Firms Questioning Pay Guides

**By Brad Schultz**
CW Staff

Many firms in the computer industry will not limit salary increases to 7% per year in compliance with the voluntary wage/price guidelines President Carter recently proposed as part of his Administration's fight against inflation.

That was the consensus of industry spokesmen *Computerworld* polled to learn how the Carter proposal may affect DP professionals.

In a nationally televised address, the President asked U.S. employers for a 7% average in wage and salary hikes, which is reportedly about half the salary growth rate for DPers [CW, Oct. 30]. Carter also requested each U.S. business to limit price increases over the next year to .5% less than any increase during 1976-77.

The plan is called voluntary, but Carter said any uncooperative firm faces denial of government contracts, subsidies or other benefits.

To be competitive in sales, a computer vendor must be competitive in DP salaries, according to Harold O'Kelly, chairman of the Computer and Communications Industry Association (CCIA) and chief executive officer of Datapoint Corp.

A vendor that posed a 7% lid would experience a massive turnover in professional and managerial employees, O'Kelly said, adding that is exactly what happened when salary constraints were last imposed — on a mandatory basis — by President Nixon.

If confronted with such a lid, many DPers would jump from one employer to another for better pay, O'Kelly explained, noting the lid covers salary increases during a term of employment, but not between terms of employment.

*(Continued on Page 5)*

## Hardware Problems Cause Near Standstill at O'Hare

**By Marguerite Zientara**
CW Staff

CHICAGO — O'Hare International Airport came to a virtual standstill for two hours on Oct. 25 because of computer hardware problems at the O'Hare control tower and the nearby Air Route Traffic Control Center (ARTCC). As a result, there were "massive air traffic delays in the Midwest," according to Richard Scholz, O'Hare air traffic controller and a representative of the Professional Air Traffic Controllers Organization (Patco).

The snafu, which resulted in 75 to 100 airplanes lined up for take-off, very few departures and no more room for incoming planes, came in the ninth month of a federal judge's continuing deliberation on whether to accede to a group of O'Hare air traffic controllers' demands for a computer backup system [CW, March 20].

A week after the incident took place, the cause of the problem at O'Hare was determined to have been "foreign material in one of the memory units of the Automated Radar Terminal System (Arts III)," according to Neil Callahan, public affairs officer for the Great Lakes Region of the Federal Aviation Administration (FAA).

The foreign material referred to was "a speck of dirt too small for the human eye to detect," he said. It was found on an internal wiring connector of the memory unit and was cleaned

*(Continued on Page 8)*

## IBM Chip Facility Brings New Beat to Vermont Town

*Last week IBM opened the doors of its new semiconductor manufacturing plant to the press. From the facility, which produces the firm's latest 64K memory circuits, our reporter filed this report on the setting.*

ESSEX JUNCTION, Vt. — Two centuries coexist within a few square miles here amidst the mottled brown landscape now lying hard and unyielding under the cool, windswept autumn sky.

The 18th century is well-represented by the farms nestled in the valleys and mountainsides, marked by steep-pitched roofs and herds of black and white milk-rich Jersey cows now confined to barnyards and huddling together for protection from the winds that whip along the shores of Lake Champlain in this corner of Vermont that nestles against the Canadian border.

And the seminal years of the 21st century are represented here by a huge, fortress-like, brown brick IBM plant covering more than 60,000 square feet and enclosing the latest computer-controlled production equipment. It rises out of the brown earth as a precursor of the future.

The men on the farms go about their tasks accompanied by the rhythms of nature, sowing the fertile valley earth in the spring and feeling the warming

*(Continued on Page 4)*

**COMPUTERWORLD**
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## *As Result of Union Talks*

# Boston Papers Forced to Limit DP

**By Ann Dooley**
CW Staff

BOSTON — This city's two daily newspapers have been forced to limit their plans for automation as a result of contract negotiations with Boston Local 13 of the International Typographers Union. Union members feared the text processing systems would displace their jobs.

The *Boston Globe* agreed during the recent contract negotiations to install text processing CRTs on a limited basis, allowing the union to retain partial jurisdiction and job security for its members. The agreement cannot be renegotiated at any time or modified by changes in newspaper management or union leadership, according to Henry Vitalle, president and business manager of Local 13.

The settlement was heralded as a real victory for typographers on many small and large newspapers throughout the country who face replacement by computers. National union officials called the *Globe* contract "the best contract negotiated in the U.S. and Canada" in recent years.

The Globe contract allows the paper to install an automated system so reporters can write stories, edit them at their terminals and send them to be phototypeset, thus circumventing the human typographers. But copy not written by a staff reporter, such as stories coming in over the counter, display advertising and legal notices, will still be handled by the typographers. Accompanying proofreading and page makeup will also be handled by the printers.

"The work will keep people busy especially during the transition period," Vitalle said, adding that union members will still have control over their jobs. There will be no layoffs when the system is installed nor any in the future unless just cause can be shown on an individual basis, he noted.

The *Globe* will offer workers dollar incentives to retire before the usual retirement age of 65 years.

"We maintained our dignity and avoided several hundred workers being laid off from their jobs," Vitalle said.

Neither *Globe* nor *Herald* spokesmen could be reached for comment.

### Common Clash

Although the union allowed *Globe* management to get a foot in the door of automation, union leaders and members seemed positive about the gains they obtained. Such is not the case for most union locals in the nation, however, which have battled against invading computer technology.

The clash between typographers and management over automation is becoming a common one as costs to produce newspapers skyrocket and automated equipment proves to be less expensive than human workers.

The fight is often considered one of survival for both sides. Newspapers have folded all across the country, unable to meet expenses; union typographers fear their jobs are being wiped out by technology. Management and many union leaders see automation as an inevitable process, but the union is fighting to stave off the inevitable for as long as possible, observers agree.

Solutions to the problem are expected to be difficult. Several major newspapers, such as the *New York Times* and the New York *Daily News*, have experienced long and bitter union strikes over the introduction of automation into the composing room.

A *New York Times* contract, finally signed after nearly 14 months of negotiations in 1974 [CW, June 5, 1974], allowed management unrestricted use of automated equipment while union members were granted lifetime job security and early retirement benefits. Printers could be transferred to jobs in other departments as they opened up or could wait in a "sub" room for any odd assignments the composing room foreman might have.

The liberality of the agreement was attributed to the fact that management knew it wouldn't have to deal with the typographers once their jobs were phased out by retirements.

Other newspapers — the *Baltimore Sun*, for example — have successfully attempted retraining programs for printers, but many printers resent being shuffled to other jobs and are bitter about being forced out of a profession they view with pride.

The computer seems to be the victor in the unions' struggle with management over automation. Union membership is estimated at 60,000 today, down from 94,500 in 1961.

# Atex Installation Scheduled

BOSTON — The automated system the *Boston Globe* intends to install is an Atex, Inc. text management system. It will be installed in three phases over a seven-month period beginning Nov. 13.

The system will include a total of 190 specially designed CRTs spread among 250 users. It will also include four Digital Equipment Corp. PDP-11/04 processors, each with 256K of memory, and one Control Data Corp. 80M-byte disk drive. Each processor will support 30 writing/editing terminals.

For extensive editing purposes, four PDP-11/34 processors, each with 256K of memory and a CDC 80M-byte disk, will support the remaining 70 terminals.

Two 96K-byte PDP-11/04 processors will serve — one as a backup — for wire service copy. All the equipment will be linked together by a multiprocessor bus to form a large network system.

Several Teletype Corp. Model 40 upper/lower case line printers will be used for any hard copy that is needed.

The system will also include a backup PDP-11/34.

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# LANDSLIDE

## The results are already in for the Great Sorting Election of 1978!

**(54% vote for Syncsort OS, only 36% for IBM 's "top" sort.)**

## Call (201) 568-9700.

**Ask for a copy of the latest "sort census."**

*Ah, we can almost see and hear it now! It is Election Night, and there is Good Old Reliable Walter, sitting exactly where you'd expect him to be—at the anchor desk in Election Headquarters. Suddenly he fiddles with that thing he wears in his ear, listens intently and says.*

*"Ladies and Gentlemen, we now have a winner in that OS sort-program race that has aroused so much interest across the nation. We predict that SyncSort will be re-elected handily with an impressive 54% of the vote.*

*"Trailing badly is the handpicked candidate of the powerful IBM Machine—SM1-5740, Release 3. Despite the fact the other IBM entries—SM1-5734 and SMO23—threw their weight behind Release 3, IBM's top-of-the-ticket candidate garnered only 36% of the vote.*

*"Will this be the last hurrah for that silver-haired, florid-faced sort known in so many of the nation's club houses as 'ICEMAN 3?' To find out, we take you now to the losing candidate's headquarters in beautiful downtown Armonk . ."*

Sorry, Walter, but we've known about these results for weeks now. Because this year, as in 1977, we commissioned those redoubtable poll-takers, the International Data Corporation, to find out for us.

They conducted a telephone survey to find out who uses what sort. The results—together with those for last year—are shown below:

**SORTS USED BY OS & OS/VS USERS IN THE UNITED STATES**

| | July 1, 1977 | | July 1, 1978 | |
|---|---|---|---|---|
| Sort Name | No. of Systems | % | No. of Systems | % |
| SyncSort | 1,333 | 43% | 1,836 | 54% |
| SM1-5740 (IBM) | 992 | 32 | 1,224 | 36 |
| SM1-5734/SM023 (IBM) | 651 | 21 | 204 | 6 |
| Other | 124 | 4 | 136 | 4 |
| | 3,100 | 100% | 3,400 | 100% |

If you'll call, we'll be glad to send you a copy of the full report. It contains some interesting information on how data processors migrate from those venerable old IBM graybeards—SM1-5734 and SMO23—to SM1-5740, Release 3 and, eventually, to SyncSort.

The reason is not hard to find. Data processors are becoming increasingly aware of inflated "sorting taxes"—overuse of CPU Time, Elapsed Time and the other valuable computer resources that go into sorting. Show them a sort that does more work for fewer resources, and they'll vote for it.

Quicker than you can say "Proposition 13."

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# Process Giving IBM 'Best Chip Yields Ever'

ESSEX JUNCTION, Vt — Using an almost totally automated production process IBM is getting the "best yields we've ever experienced" in the production of its new 64K-bit, 32K-bit and 18K-bit memory chips, according to Dr Edward M Davis, vice-president of the firm's General Technology Division here

The yield on a batch of semiconductors is the amount of good or usable chips that is produced and is usually expressed as a percent of the total throughput of a plant

And while Davis claimed that the exact yield IBM is getting in its new process is "proprietary," he claimed it is "better than the industry" average for this point in the production cycle

Although IBM did not announce the new chips until it unveiled the 8100 information system [CW Oct 9] and the System/38 [CW Oct 30] it has actually been making them for more than a year

The first engineering parts were delivered from pilot lines here in August 1976 and production of manufacturing parts began in June 1977, with volume production for inventory starting in January 1978 Davis said.

And the new 64K bit unit is not just a memory chip — it contains several functions that would have otherwise required external support circuitry, he said Since IBM is designing the chips from a total systems point of view, he said the firm made trade-offs in chip size in order to accommodate these additional functions on the chip

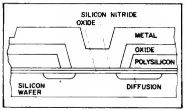
For example the unit contains an 8 bit register capable of 100-nsec data rates bidirectional data I/O bussing, and the ability to access data while refreshing Davis said

### High Priorities

J K Picciano advanced memory products engineering manager during development, said that in developing the new technology the goals of high-density memory chips and manufacturability were given a high priority

The technology for producing the field effect transistor (FET) devices and the majority of the interconnections in five masking steps is a simple process capable of very high yields, he said

First, a doped-oxide layer is deposited etched and driven into the silicon, forming the diffusions for the FET devices, storage nodes and diffusion interconnections An ion implant is used for threshold adjustment, and the doped oxide is removed selectively where desired.



FET in IBM's New Process

Second, a thin layer of oxide, a layer of nitride and a layer of polysilicon are deposited in one process flow — resulting in a controlled method of making the gate insulator, oxide-nitride, and the silicon gate. This silicon gate later can be used as a field shield.

Third, the polysilicon is etched where contact holes, or gates, are desired and oxidized to insulate it from the metal layer At this point, all contact holes are etched to allow contact to the polysilicon or silicon layers.

Fourth, aluminum-copper metallurgy is deposited and defined through a lift-off, rather than subtractive etch, process to provide control of the fine-line geometry

Fifth, the chip is completed by adding a second metal layer. Picciano pointed out that polyimide is used in this process as part of the insulator and seal for the chip.

A feature of this family of chips involves the use of redundant lines and redundant functional islands to enhance early yield and manufacturability. Each chip contains several redundant lines and a fusible link read-only storage (ROS) on the second-level metallurgy.

By programming this ROS at final test, the redundant lines can be utilized to replace bits or lines that do not perform properly. Inhibiting of addresses and substitution then are performed totally on the chip without any change to its external operation.

In addition, the chips are organized with two or more functional islands. This allows use of redundant positions in the module package to further enhance productivity.

# System/7s Controlling Operations

ESSEX JUNCTION, Vt. — In order to meet geometries as fine as 2.5-micron line widths, IBM is using 60 System/7 computers linked to a 370/168 to control almost all of the operations of its new semiconductor processing line here

Seven of the System/7s are used just to monitor the locations of individual wafers, each of which contain 107 64K-bit or 32K-bit chips or 144 18K-bit chips.

The others control specialized processes, such as sputtering, evaporation or etching, along the line here.

As wafers are loaded into each section of the plant, they move along air tracks looking much like small frisbees to the various process points. At each piece of equipment, the wafers are held and identified by a laser and optical sense loop. If that wafer is scheduled for processing by that particular piece of equipment, it is then shunted into the processing device — again with all movements controlled by streams of air

At all times, the System/7s are reporting information on the wafers to the 370/168, which in turn sends the data to a Manufacturing Operations Communications Center where it is displayed on a wall-sized mock-up of the entire plant Each wafer that is on the line is identified and shown on the mock-up so that any slowdowns can be spotted immediately

This extensive use of computer control has helped cut the learning curve in processing chips, IBM spokesmen hinted, because it provides complete information on the processes at all points in the line to identify bottlenecks or sources of errors

# IBM, Farmers Coexisting

(Continued from Page 1)

rays of the summer sun and cool breezes on their backs as they cultivate the corn and hay crops of the summer.

Now, with winter rapidly approaching, frost upon the land and light snow in the high mountains ringing this lake shore valley, their attention is on getting the wood in for winter, with huge cords of oak and birch falling under their splitting mauls to be placed in the rough-hewn sheds that dot the landscape

And the other rhythms of farm life continue — rising before the sun to brave the cold on the way to the animal-warmed barns redolent with the smells of the cattle herds and the hay stacked high for the winter forage

### Startling Contrast

Nestled within this community of farmers and small shop keepers, the IBM plant offers a startling contrast, no worse and no better than the surroundings but certainly different.

The plant blends with the environment, standing brown against a brown landscape, set off on an access road by itself, and not at all overpowering the white clapboard houses and churches that make up the rest of the community.

But inside, the contrast with the surroundings is staggering.

Production line personnel wear white smocks, in many cases with hoods over their heads and special coverings for mustaches and beards, producing a feeling of uniformity and anonymity — a far cry from the various overalls, checked shirts, work pants and battered hats sported by the region's farmers.

No natural light penetrates the center of the IBM plant, which maintains a steady, flourescent glow day in and day out, night or day. But other lights dot the interior landscape: the purple glows of the deposition furnaces and the red glows around the darkened areas that house the photolithographic etching equipment.

And the sounds are different too; the gentle lowing of cattle or barking of dogs or songs of birds is replaced by an almost total silence, interrupted only by the clicking of solenoids and the hum of various pieces of equipment and the gentle sound of air moving in the cleverly designed air transport tunnels that move silicon wafers on their travels from their "raw" state to become completed memory circuits.

### Antiseptic Environment

And no motes of dust advance and swirl, trapped within beams of sun. The atmosphere is antiseptically clean, a necessity with the close tolerances of the semiconductors made here, with dust or any other forms of contamination screened from the atmosphere.

The air tracks that transport the silicon wafers are so clean that there are only 10 parts of contamination in a billion parts of air. This would be like having a string of tennis balls stretching from the earth to the moon with only one of an inconsistent color.

The plant's pace is not determined by the seasons, but is under the direction of the 60 computer systems that monitor and control every process, following each wafer along its journey and alerting the operators to any glitches.

The Manufacturing Operations Control Center (Mocc) is the heart of the system, much as the kitchen is the heart of the farm home. Information is fed here from the process and monitoring computers and displayed on a wall-sized mockup of the plant.

The contrast between the inside of the plant and the pace of outside life is almost complete and surreal.

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## *Thanks to Advance of DP*

# Ticker-Tape Parades Quickly Becoming Extinct

**By Tim Scannell**
CW Staff

NEW YORK — If a recent ticker-tape parade here feting the world champion New York Yankees baseball team is any indication, traditional forms of the celebration are doomed to follow the same route as gas street lamps, coal-powered bed warmers and the Model T — thanks to computer systems.

The ceremony, held in honor of the Yankees' victory over the Los Angeles Dodgers and capture of the 1978 World Series title, included the scattering of nearly 135 tons of paper along the city's half-mile designated parade route, according to Sanitation Department figures.

However, the bulk of the material tossed by the more than two million enthusiastic spectators consisted of computer punch cards, rolls of bathroom tissue and several shoes rather than the standard telegraphic paper ribbons.

City officials blamed the absence of ticker tape and the relatively small amount of paper generated by the parade on the advent of computers and their "paperless" processing.

Sealed windows in centrally air-conditioned skyscrapers were also cited as a paper-limiting factor during the recent parade.

The most paper produced from a ticker-tape event was 3,474 tons, which the city collected in 1962 during the parade for astronaut John Glenn, Sanitation Department records revealed. The return of Gen. Douglas MacArthur in 1951 was heralded by 3,249 tons, the second largest amount, and Charles Lindbergh's parade in 1927 generated 1,750 tons.

# Firms Won't Follow Guides

*(Continued from Page 1)*

Since hardware production costs are dropping, the Carter price constraint should not trouble the industry except in labor-intensive areas such as maintenance and support, he continued.

The Carter plan may force the Administration to contradict itself, O'Kelly said. For example, "It's a bit ridiculous to have a 7% suggested guideline when we're already faced with a 9.4% increase in the minimum wage, effective Jan. 1."

The minimum wage hike from $2.65 to $2.90 will result in wage and salary hikes "at all levels, he predicted. "In that case, which policy are we supposed to follow?"

### Dim View

Texas Instruments, Inc. has taken a dim view of the Carter guidelines.

"We at TI concur with the spoken determination of the Administration to accelerate the fight against inflation. However, we think wage and price guidelines or controls represent an ineffective and wasteful way of fighting price increases," TI senior vice-president L.M. Rice Jr. has stated.

"Controls or guidelines, either voluntary or mandatory, have never worked in the past and there is no reason to expect them to do so in the future," Rice added. Nevertheless, TI plans to comply with the Carter program.

Business-sector cooperation "won't amount to much" unless federal, state and local governments cut deficits and improve productivity and efficiency, according to Brad Stroup, Data General Corp.'s director of financial and public affairs.

Stroup agreed with the other vendor spokesmen that federal government excesses are the source of inflation but called Carter's proposed federal worker layoffs and elimination of commercial safety/health requirements — which are said to dampen productivity — "trivial nitpicks."

Success in the fight against inflation will require that the government must act, Rice continued. "We must put a ceiling on government spending as a percentage of Gross National Product. We must manage the growth of the money stock at a steady rate about equal to the average growth rate of physical output."

DG president Edson D. de Castro expressed the mini vendor's concern that "there may be a loophole in the guidelines. While Carter emphasized the need to boost productivity, he did not appear to indicate incentives for those who can do better than the guidelines.

"There should be some mechanism to allow companies to reward employees who can work to produce even better productivity price improvements than the guidelines call for," de Castro said.

Honeywell, Inc.'s chairman and chief executive officer, Edson W. Spencer has announced the vendor will "cooperate to the maximum degree possible with the President's program in holding down prices as well as salary increases."

At press time, with IBM, Univac, Burroughs Corp., Hewlett-Packard Co. and Digital Equipment Corp. abstaining from the CW poll, Honeywell and TI remain the only major computer vendors to pledge full compliance with the Carter controls.

DOS LEAPS AHEAD OF OS THANKS TO SPACE/MANAGER

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# Times 'May Be a Changin' for DP Managers

*(Continued from Page 1)*

I was the first person from the DP environment to be promoted to the officer level,' he said in an interview last week, "while today, out of about 800 officers, more than 85 came from the DP ranks."

### Overlap of Roles

The delineation between top-level management and DP activity "is becoming fuzzy," he noted. "There are more officers in operating divisions of companies who do things that are largely in the DP business; to solve their business problems, they may use as resources not only the people they manage, but also a sophisticated DP system."

In the long term, management will be more willing to recognize the level of responsibility and complexity of the DPer's job, he said, but for this to occur, "the DP manager has to be more of a businessman than a technology expert."

The reason, according to Sitkin, is that the DP manager as a technologist only often cannot target the specific needs of his company. In the past, he noted, "I'd seen and heard descriptions of DP systems that were designed as an end in themselves — that is, to solve a problem, but not necessarily the problem the business, or user, faced."

### Limiting Factors

A number of factors have limited the scope of the DP manager function, according to Sitkin. For one thing, he noted, people who teach computer science or who develop academic programs in computer science "still pitch the training to a much heavier machine orientation — for example, learning about the operating system and about programming languages — than to a business applications orientation."

In addition, he said, "It is very easy for a DP manager to become enamored with the technology because it is glamorous, there is a lot of it and it is constantly changing. Every day someone is knocking on your door with a new, wonderful system at a lower price.

"In the past, either the DPer was much more comfortable in the technological environment or management wasn't receptive to what contribution he might make at a senior or broader level. Back in the early '60s, many people complained that systems analysis and development work took longer than expected and cost too much money."

### A New Breed

Today, however, a new breed of DP managers is coming to the fore, Sitkin maintained. Business schools and universities are graduating more people with an understanding of computers as well as business.

And with experience, DPers are gaining a better sense of their roles and responsibilities as they fit into the total corporate picture, he added, and are therefore communicating more effectively with their users.

Toward this end, the DP community over the years developed a number of tools to help its managers address users problems and come up with effective solutions, Sitkin said, citing the phase development approach which has been used at Aetna since 1971.

This approach breaks down the problem-solving process into a number of phases: problem identification, feasibility of a mechanized (or any) solution, preliminary system design, actual system design, programming, test, installation and post-implementation review. After each phase, the user and the system developer communicate as to progress made and the direction subsequent steps should take.

At Aetna, Sitkin developed an executive training program in the early '60s designed to "remove the mystique from the computer and open up the communication channels between DP managers and users. During the program, corporate managers down to first-line supervisors interact with DP personnel to describe and identify problems and jointly participate in developing mechanized solutions," he explained. The course was updated about two years ago and is offered every three or four months.

As the DP manager defines his role more in terms of a total business orientation and less in terms of technology, he will gain more upward mobility, Sitkin predicted.

"The contribution I make at Aetna is as a businessman and manager of resources, rather than as a super technology wizard," Sitkin noted. "In the future, more DP people will be selected for such high-level positions as chief operating officer because of their understanding of business and not because they are good technicians."

# Managers Told Not to Feel Limited to DP

*(Continued from Page 1)*

to move from a DP management to a general management spot, according to Jerome W. Geckle, president of Peterson Howell and Heather, Inc., a business service bureau.

This intelligence must be applied to an understanding of people, Geckle told the session entitled "DP. Arrows Are Pointing to Management — Don't Lose Your Way." The manager should realize that people are controlled by emotions rather than facts, he said, indicating that people are seldom manageable purely by strength of argument.

"Technical excellence does not make you a manager; it can only get you half way, Geckle added, noting that "superstars" rarely succeed as administrators.

The test of a manager is whether he can deliver results Geckle continued, explaining that the end is generally more important than the means in a business environment.

Geckle told the session that distributed data processing (DDP) is a marvelous opportunity, not a crisis, for commercial administrators. DDP will enhance the manageability of regionwide or nationwide organizations as it proliferates in the next decade, he said.

The successful manager understands the business of his organization — "That's the name of the game," according to John L. Jones, Southern Railway's assistant vice-president of management information services.

The successful manager must also understand the "management style" of his firm, whether it is autocratic or committee-oriented, Jones continued. Further, corporate management should understand what he is trying to do.

# Image Problems Described

*(Continued from Page 1)*

national product manager came in sharp contrast to predictions made at other conference sessions that the DP manager has a good crack at top management spots, including company president.

"We are stunting our growth and we don't realize it," Simone declared, explaining that DPers are "scaring people away" by "talking funny" and that DPers are seldom seen as contributing to the corporate objectives. If DPers want to move up in management they must demonstrate a personal contribution to the firm's profits, Simone advised the session.

Other departments, such as marketing, are usually considered a far more significant contributor to profits; that is why company presidents tend to come from these departments, rather than DP, he observed.

For this reason, DP managers with an eye on top management jobs should continually demonstrate their worth, Simone said, indicating that non-DP executives need to be educated in the relationship between DP and total company progress.

The ambitious DP manager should eliminate buzzwords in his conversation with others and strive to generally improve his communications skills, he advised.

As technology progresses and the state of the art advances, DPers should hold training seminars to spread the news of what has become available to the firm's other sections, Simone continued.

Further, DP managers ought to continually review DP budgets, eliminating unnecessary expenses — for example, extravagant card reading systems in a nearly cardless shop, he said.

Finally, the upward-bound DP chief needs to find out where the company is going and what new products and services will develop, Simone added.

Whether or not the top ranks are reached, these recommended steps will improve the DP manager's perceived contribution to the organization as well as win greater job satisfaction and personal pleasure, he asserted.

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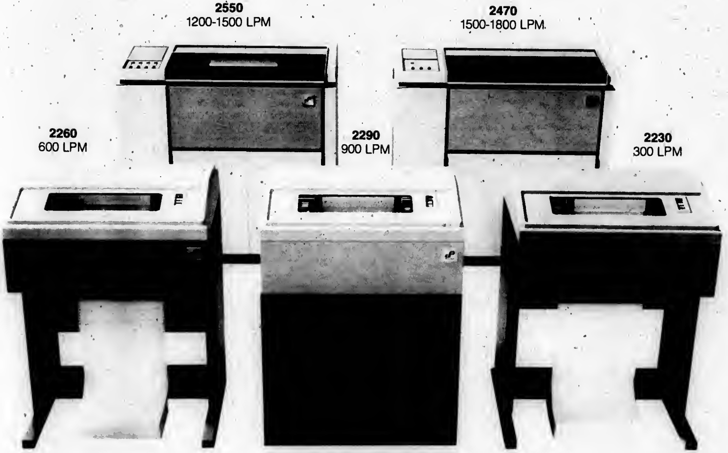

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# Hardware Snags Stymie Operations at O'Hare

*(Continued from Page 1)*

out 19 hours after the system first went down. The cause of the ARTCC computer problem was still under investigation at that time.

### Beginning of Problem

The problem began at 9 a.m. when the computer system at the O'Hare control tower, based on two specially built Univac 8303s, went down, Scholz noted.

Arts III generates a display that is superimposed on the radarscope, identifying an airplane by airline name and number and providing its ground speed and altitude.

When that system goes down, the greatest impact is felt in the first few minutes when air traffic controllers must adjust from a visual to a mental 3-dimensional picture of where the planes are, Scholz explained.

However, the failure of the O'Hare system alone did not cause the serious problems on the runways, according to Warren Webber, data systems officer at the control tower. "It wouldn't have made the big impact that it did if the center's [ARTCC] computer had kept working," he noted.

The ARTCC in Aurora, about 30 miles west of Chicago, is one of 26 control centers in the U.S., Scholz said. The Aurora center employs 600 air traffic controllers and has jurisdiction over 185,000 sq. miles of air space in the Midwest.

### Circulation of Flight Data

Control centers pass information on scheduled flights through several points between airports as planes enter and leave their jurisdictions. Information includes flight number, type of aircraft, altitude, air speed and estimated time-of-arrival at the next control center.

This information is imparted in two forms — by radar and printed out as flight strips," Scholz explained.

The flight strips are backup for the radar, he said. "If the radar stops, the air traffic controllers should be able to keep the airplanes separated at different altitudes using the strips," he pointed out.

But when the ARTCC computer went down, the center lost not only the digitized radarscope displays, but also the flight strip data.

Those losses necessitated writing out flight strip information in longhand, a process that is "fantastically slow compared to the computer," according to Terry Anderson, air traffic controller and Patco representative at ARTCC.

The information on the flight strips must be received by an air traffic controller before he can accept an arriving airplane, so he can maintain the 5-mile minimum spacing requirement between planes, Anderson explained.

### Reason for Delay

Because flight data had to be processed manually at the ARTCC, slowing down the rate at which aircraft could be accepted for en route control, take offs were stretched out at O'Hare airport.

The center has an IBM 9020E which, "either because O'Hare's computer was down or because they couldn't shut off the information that was supposed to go to O'Hare's computer," malfunctioned by building up information in its memory instead of passing it to a "drop," Anderson said.

By about 1:30 p.m., Anderson said, the 9020 was working at 80% storage capacity, and by 4 p.m. it was working at 95% capacity. At that point a number of functions, including the center's radar, were nonoperational, according to Anderson.

### 'Flops' Not Successful

Center personnel at that time "flopped" the machine, in other words, emptied it of information in an attempt to reject whatever was causing the problem, Anderson explained.

Within one hour, however, it was again working at 95% capacity so 20 minutes later they flopped it again, inputting only "live" flight plans, Anderson said.

Although the technique again did not work, by 8:30 p.m. air traffic began to subside, making it easier for the computer to function, Anderson noted.

A combination of heavy air traffic and poor weather conditions compounded the problem, Anderson said, but there have been times in the past when more traffic information has been fed into the computer than there was that day "and we've never had that problem."

A week later, although the cause of the center's problem still had not been found or corrected, it was operating at an "acceptable level," Anderson said.

### Problem Investigated

The 9020's problem was then being investigated by Chicago center personnel in coordination with technical specialists from the National Aviation Facilities Experimental Center (Nafec) in Atlantic City, according to Callahan, the FAA's public affairs officer.

"Our major concern is that this situation could very well happen again tomorrow or the next day," Anderson observed, given the factors of heavy traffic, poor weather conditions and Arts III going up and down, "none of which is a rarity."

According to Scholz, O'Hare's computer system failed on 46 days in 1977 and on six days during the first two weeks of 1978.

### Backup Demands

Demands for a backup system and new software testing procedures at O'Hare were made in a lawsuit filed in 1975 by 63 O'Hare air traffic controllers against the FAA, the Civil Service Commission and the Department of Labor.

The trial took place in January 1978, and a decision is still pending. In light of the recent computer failure, last Monday the air traffic controllers filed an affidavit with Federal Judge John Powers Crowley asking for a quick decision in the case.

# Donald Duck Paid by HUD

*(Continued from Page 1)*

The system should have rejected the $99,900 check on its face value, because maximum federal pay is currently $47,500. However, the HUD payroll system does not have any limit checks; salary amounts are limited only by the number of digit fields, Cronin noted. "If we decided to pay Donald Duck $100,000, it would have been truncated and he would have gotten nothing."

Despite a 28-year-old law requiring that all federal accounting systems and those that are later modified be approved by the GAO, 40% remain unapproved, according to Cronin. "The HUD system was approved in 1970," he noted, "but many of the edit checks that were supposed to be in the approved design had disappeared from the operation.

"We were told by some of the people there that they ran into a problem with core storage capacity and had to drop out a lot of the edits.

"In a case like that, we see only two alternatives — either don't drop out the edits or figure out some way to increase capacity. Some computer systems can be added to, such as with disk pack storage units, but I don't know whether that alternative was explored at the time," he said.

The software programs for most federal payroll systems are written by the agencies themselves, Cronin said, adding that many also use modified versions of programs from other agencies.

### Taken by Surprise

The GAO findings from its "Walt Disney" experiment took HUD by surprise, he said. "HUD felt, however, that its own output reports — on who got paid and how much — would have disclosed the erroneous $99,900 figure, which would then have been brought to someone's attention and questioned.

"We felt that it shouldn't have gone that far," he stated, "and should have been stopped in the initial input stage."

A fraudulent transaction is not the same as an erroneous transaction such as the $99,900 check, Cronin explained, "and a computer should reject an erroneous transaction. A keypunch operator could make a mistake and whether it would be spotted by a manual check is somewhat speculative."

If, however, a HUD employee knew the payroll system and decided to up his salary to $40,000 — which is within the federal salary limit — this would be a fraudulent transaction and would go through undetected, he added.

### Recommendations to HUD

While the GAO, as an auditing and investigating body, does not have authority to implement controls at the various agencies, it did make some recommendations to HUD based on its findings:

- That the agency increase controls over source documents and time and attendance records.

Often, Cronin said, these documents are processed without the necessary approval of regular hours or authorization of overtime hours, and even after they are approved, individuals have been able to change the number of overtime hours.

- That it separate the duties of payroll and personnel employees.
- That it improve controls over computer processing and record maintenance.

This last recommendation, according to Cronin, called for several changes: to better control the use of dummy Social Security numbers; to remove or segregate from the master pay file the records of employees that have left the agency; to impose better edit checks; to periodically reconcile personnel and payroll files; and to improve physical controls over computer programs.

According to Cronin, HUD's computer programs were kept in the computer room rather than in a restricted area like the tape library.

In 1976, GAO submitted a report to Congress stating that the more than $40 billion in transactions generated by government computer applications were not adequately checked and that this caused errors that could cost taxpayers "tens of millions of dollars" yearly [CW, May 17, 1976].

## *Unless Procedures Improve*

# DP Contract Litigation Viewed as Booming Area

**By Jake Kirchner**
CW Washington Bureau

WASHINGTON, D.C. — Computer contract litigation should be a booming field for years to come, considering the sorry state of existing DP contracting procedures.

That was the consensus of participants at a recent meeting of The Computer Law Association here that featured speakers representing both users and suppliers of DP services and equipment as well as attorneys specializing in computer law.

The speakers, brought together Oct. 16 to discuss "Contracting in the Computer Industry," also concurred that litigation over DP contracts is almost never beneficial to either user or supplier and, in most cases, could be avoided through better contracting procedures.

### No-Win Situation

"The last thing in the world we want is lawsuits; what we want is performance," according to Roy N. Freed, a partner in Powers & Hall law firm, Boston, and a specialist in computer systems and software contracting.

"Litigation is a no-win situation," Freed remarked. A lawsuit "can never really compensate an unhappy user."

Agreeing with Freed was Edward F. Langs, Burroughs Corp.'s legal director, who said "contract negotiation should not be an adversary proceeding."

Several of the speakers suggested most DP contracting problems could be avoided if the user would prepare a detailed list of specifications for the job he needs done and then seek a guarantee that the product will meet those specifications from the supplier.

"Creating realistic performance specifications is beneficial to the customer and the supplier," according to Freed, who said it "astonishes" him that so many users are unwilling to identify how they will use the product for which they are contracting.

"The major problem in computer contract negotiations is the lack of a user statement of wants and needs, Langs said. The user should be "very, very specific in defining needs."

A warranty on specifications, he added, would be better for the user than some types of warranties commonly used today. He gave as an example warranties on uptime percentages.

If a customer asks for a guaranteed uptime percentage that is too high, he explained, the vendor's field agents might end up "watching the clock" while performing maintenance and be more likely to do a quick "patch job" when a major repair is needed.

Langs also said that a problem often arises because of lack of standard definitions in contract terminology. "If you want your specifications [met]," he advised hardware users, "Use language everyone can understand." This is especially important in case there is litigation over the contract later, he added.

### Acceptance Testing

Speaking from a user's viewpoint, John A. Gosden, vice-president of corporate computer services for The Equitable Life Assurance Society, said once a user has decided on his specifications, the next critical step is acceptance testing.

On this subject, Langs pointed out that hardware vendors often welcome acceptance tests because they allow the vendor to determine if he can meet the user's requirements. Such an understanding before the contract is drawn up and signed can prevent later litigation, he noted.

Freed explained that a user needs not only an initial acceptance test, but periodic testing to assure system compliance with performance specifications over the term of the contract.

Turning to contracting for software, Paul S. Hoffman, a New York attorney specializing in computer law, said a software vendor must be "careful to avoid overkill." The vendor should not demand a contract so unreasonably strict that it might be thrown out of court if litigation arises.

A software user must also beware of the restrictions in vendor contracts, he said. The user must make sure he can live up to the terms of the software license and not be "in technical violation from Day One" because of restrictive contract conditions.

### Trade Secret Issue

A major item in computer contract negotiations discussed by The Computer Law Association panel was the trade secret provision. Gosden, in his presentation, insisted that the DP customer has a right to "practical trade secret rules."

Hoffman noted that getting trade secret protection for a vendor "depends a lot on how a company operates." The vendor must act as if his product is secret.

Suggesting several steps to take in that direction, Hoffman said the vendor should:

- Establish an internal security program.
- Obtain confidentiality agreements from employees.
- Remind employees not to leave se-

*(Continued on Page 10)*

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In actual practice, the large companies with the big budgets spend many thousands of dollars for seminars and inhouse training materials. They set up task forces whose job it is to develop a system and establish standards for using the new techniques. They devote many man-months of programmer time for retraining. And when the dust settles, it's only the unusual shop that shows any real improvement in productivity.

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The second book, *The Structured Programming Cookbook*, is a reference book for use after training. It gives complete standards for developing structured programs in a COBOL shop. And it gives complete design, documentation, and coding for four business programs. By reducing program re-invention, these model programs can have a major effect on programmer productivity.

If you haven't started using the new productivity techniques in your shop, Paul's books may be the best investment you'll make this year. On the other hand, if you have experimented with the new techniques but you aren't satisfied with the results, please review these books. They have already helped many other companies turn theory into practice.

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# DP Crime Blamed on Dummies, Not Thieves

## CW at DPMA

By Brad Schultz
CW Staff

NEW ORLEANS — As a threat to data security, "the dummies have it over the thieves hands down," a session of the 1978 Data Processing Management Association (DPMA) conference here last week was told.

IBM security expert Robert Courtney told the session entitled "A Rational Approach to Data Security" that carelessness and stupidity constitute the number one threat to the safety and integrity of computer-stored information, while espionage and embezzlement are far less common.

Courtney defined "data security" as safety from accidental or intentional modification or destruction of data.

A major organization recently suffered from bungled data management involving records of obsolete equipment the organization owned, Courtney said. The computer system that stored these records was programmed to automatically order more of the obsolete equipment in the event its supply dwindled to nothing.

A top-level management team ordered the equipment to be sold without advising the system auditor, thus all the obsolete materials were reordered and restocked.

Dishonest employees constitute the second greatest security threat, Courtney continued, adding that computer rip-offs are almost always "inside" jobs.

White collar computer crime does not usually cross functional boundaries, he observed, explaining that abuse in a department — accounting, for example — is usually perpetrated by a member of that department.

Courtney called fire the third-ranking security risk, adding that companies frequently underestimate this risk when installing computer systems in tall buildings.

For example, a firm might install a CPU on the 60th floor of a very tall building under the assumption that fire is likely to occur on that floor once in 300 years. The firm does not realize fire, much more likely to occur on lower floors, will knock out electrical flow to the CPU, he said.

The fourth greatest risk is the disgruntled employee. Generally acting under acute emotional strain, this individual can destroy records and even equipment worth millions of dollars, Courtney told the session, noting that some enraged workers have blasted peripherals with firearms.

### Beware of Water

Rating water as the fifth worst danger, the IBMer said burst water pipes, overflowing upstairs sinks, broken sprinkler heads and similar malfunctions have caused far more damage to computer hardware than floods and other natural water disasters.

He told of one user that installed several CPUs in a hillside structure with a slightly sloping floor to permit drainage through a hole in one wall. Unfortunately the user made the draining wall face the hill's summit: The next rainfall caused water to run down the hill, enter the drain from the outside and flood the facility.

At the first sign of leakage in the proximity of a computer system, a user should power down the system and wrap it in a polyethylene sheet, Courtney advised, adding this sheet typically costs about $15 and should be kept on hand for such emergencies.

Finally, the sixth most serious security threat is the ego tripper, he said, explaining that such people have wrecked systems by trying to implement elaborate modifications as show-off stunts.

### Three Ways to Get In

Courtney also described three means of permitting access to classified computer-stored information: "things you know, things you are and things you have."

Passwords epitomize the first category and are among the least effective methods of access control, he said, since programmers often tell their passwords to colleagues.

Under "things you are," Courtney included fingerprint, voiceprint and similar means of physical identification. This method entails permission of access upon successful matching of sample and library records; for example; the thumbprint of the user must match the thumbprint of his claimed identity.

The last category includes identification cards that are inserted in special readers. Such cards often provide too much information, Courtney said, and can thus be dangerous in the wrong hands.

Cards should carry only embossed numbers, excluding information that could assist impersonation, he explained.

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# Litigation Booming

*(Continued from Page 9)*

cret material out in the open.

- Obtain a secrecy agreement before releasing secret material to prospective customers.

The last point is especially important when the prospective customer is the federal government. Hoffman noted.

The software vendor should make sure the user has appropriate safeguards over licensed products, Hoffman continued. The vendor should also know the physical location of his product and have the right to inspect the user location, he said.

These steps are vitally important, according to Hoffman, if the vendor ever has to establish the right to trade secret protection in litigation.

### Preventing Software Theft

Hoffman also urged software vendors to make sure licensees will help prevent software theft. It is better to include the user in the vendor's security program than to claim damages If the product is stolen from the user's premises, he said.

Freed agreed, saying that legal means of protecting trade secrets do nothing to actually protect the product; they only provide for specific legal consequences if there is a theft.

Langs suggested that users not "ask for too much" in contract negotiations. It does no good to "provoke a war" over every item in the contract.

He also suggested users should *want* vendors to make a profit. There are grave consequences for users when major hardware vendors leave the marketplace, he explained.

Countering that argument, Freed said a vendor should consider its contract as a "marketing opportunity." It's only good business, he observed, to consider the needs of the user.

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# Sources of Revenue For IBM Plotted From '73 to '82

With this chart, the Technology Analysis Group (TAG) of Advanced Computer Techniques Corp. (ACT) and *Computerworld* initiate a "Chart of the Month" feature.

In or about the first week of each month, ACT/-TAG will generate — and CW will publish — one chart depicting information such as selected industry measures and trends, the relative positions of various DP vendors, technological developments and their projected impact upon users and manufacturers and fluctuations in the economy's DP sector as these relate to the national and international marketplaces.

The basic objective of each chart in the series will be to synthesize and interpet various data that together constitutes a unique commentary on, and "snapshot" of, computer industry events of importance to the DP community. One particular goal of the ACT/TAG charts is to direct the reader's attention to informational interrelationships that might not otherwise have been apparent.

## Chart of The Month

This chart projects trends in IBM revenue sources and is principally derived from IBM's FY78 "10K Report." It projects where IBM revenues are expected to come from in the next four years.

For those inexperienced in the arcane world of IBM divisions, following is an explanation of abbreviations: DPD: Data Processing Division; GSD: General Systems Division; OPD: Office Products Division; FSD: Federal Systems Division; and SRA: Science Research Associates.

Other abbreviations include R&S: Rental and Services; FE: Field Engineering; SE: Systems Engineering; and PSR: Programming Support Representatives.

It is interesting to note that while revenues from rental of computer equipment are expected to remain relatively flat for the next few years, IBM is expected to make significant increases in the sale of computer equipment and in the revenues generated by software and services.

In fact, the software and services area is clearly the fastest growing within IBM and is expected to continue its rapid growth, particularly with the recent advent of unbundled operating systems on the 8100 and System/38 computer systems.

This rapid growth will enable the firm to continue its record of growth in earnings and revenues, even while the importance of hardware sales declines as a part of the firm's overall revenue.

ACT is perhaps best known to CW readers in the person of its president, Chalres P. Lecht, whose recent book, *The Waves of Change*, first appeared in print as a series of illustrated excerpts in CW issues from April to October 1977. Lecht's work-in-progress, *Tsunami*, is appearing in installments in CW this year.

Many of the charts and figures that contributed to the value and success of both *Waves* and *Tsunami* were generated expressly for them by TAG, which now brings the "Chart of the Month" to *Computerworld*.

Further information pertaining to ACT/TAG can be obtained by writing directly to TAG, Advanced Computer Techniques Corp., 437 Madison Ave., New York, N.Y. 10022.

— — —

The information and statistical data contained in these charts has been obtained from sources TAG believes to be reliable, but whose accuracy or completeness TAG does not guarantee.

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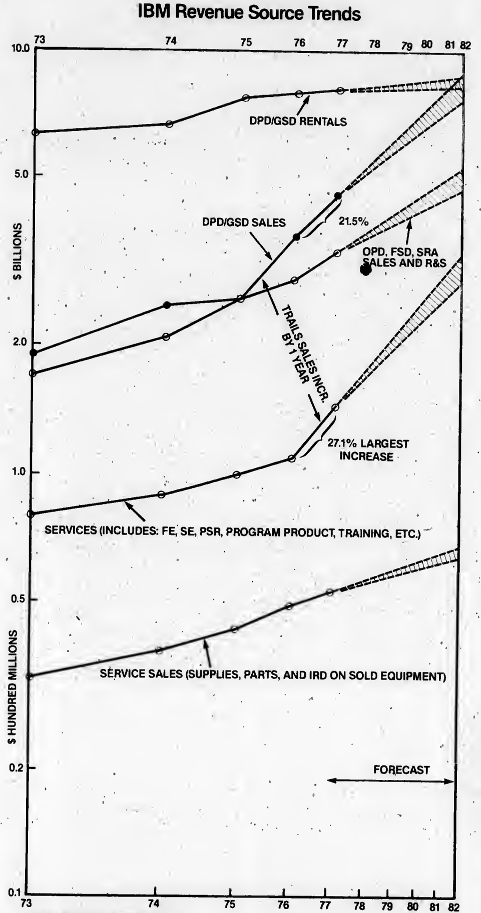

| | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 |
|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL REVENUES ($BILLIONS) | | 12.7 | 14.4 | 16.3 | 18.1 | 20-21 | | 22·24 | | 25-28 |
| PERCENTAGE CHANGE | | | | 13% | 11% | 15% | | 22·25% | | 15-18% |

SOURCE: ACT/Technology Analysis Group (TAG)

*Excludes other or miscellaneous revenues

## *Business Programmers in Great Demand*

# Bright Future Forecast for Most DP Job Types

By Brad Schultz
CW Staff

NEW ORLEANS — Qualified applicants in most DP job categories are in demand and will stay that way into the 1980s, a session of the 1978 Data Processing Management Association (DPMA) conference here was told last week.

Sam W. Love, Houston and New Orleans branch manager for Source EDP, an industry placement bureau, told a session entitled "Career Planning for the Data Processing Professional" that commercial programmers are in "exceptionally high demand"; in fact, business DP managers should intensify programmer training to offset a labor scarcity likely to continue for years.

CW at DPMA

The proliferation of the mini- and microcomputer systems in the private sector has created a wide range of commercial software activity; many first-time users are now searching for competent programmers with a business background, Love said, adding that a business baccalaureate is usually preferred.

However, scientific programming is the one DP specialty undergoing a fall in demand, Love noted, explaining that engineers and scientists usually develop programming skills as undergraduates and thus have little need for full-time scientific programmers on their technical projects.

A B.S. in engineering, mathematics or a natural science is now commonly required of entry-level scientific programmers, Love added, and a master's degree is preferred.

Systems software programmers are in high demand by vendors and consultants, especially programmers with data base or teleprocessing experience, he continued. Proficiency in assembly as well as in high-level programming languages is usually mandatory.

### Wanted: 'Practical Thinkers'

The growing popularity of financial and economic modeling as a tool of management science means programmers who are "practical thinkers" and "profit-oriented" are attractive to consulting firms and government agencies, Love indicated, adding that a master's degree is also often desired for this specialty.

In addition to technical competence, senior analysts, DP project leaders and consultants must have polished interpersonal and communicative skills, he told the session.

Love called DP auditing an attractive career path for finance personnel who want to enter the DP world or for DPers angling for more financial exposure.

Other professionals rated in high demand: technical services managers, systems and programming managers, data center operations managers, information systems directors, marketing representatives and marketing managers.

Managers cannot function, however, without strong interpersonal acumen and leadership traits, Love observed, adding that marketing representatives are typically extroverted and aggressive.

### High Pay, No Growth

Many organizations are coming to realize that not every DP professional wants to become a manager, Love noted. In many shops, certain DP technicians are now earning more than managers.

However, a number of technicians have become trapped in highly paid positions with no chance of development, and these professionals are among the first to go in the event of layoffs, he said.

Love told the session that "many times an individual's personal plan for reaching his potential does not take into account facts relative to his own technical and personal skills, education, industry work experience and the age old duo — supply and demand."

He advised DPers to accurately appraise what they want in life, to focus on what is relevant to their personal goals and to "have fun; take a chance."

# Precollege Training Under Study by ACM

EUGENE, Ore. — The Association for Computing Machinery's (ACM) Elementary and Secondary Schools Subcommittee wants help in developing guidelines for precollege-level instruction in computer science, an ACM spokesman said.

The guidelines are intended to assist in teacher training as well as facilities planning for elementary and secondary schools, ACM explained.

Interested persons should contact the subcommittee's chairman, David Moursund, at the Department of Computer Science, University of Oregon, Eugene, Ore. 97403.

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## *As Hardware Outlays Rise*

# IBMer Predicts Drop in DP Personnel Budgets

**By Brad Schultz**
CW Staff

NEW ORLEANS — The average DP center can expect larger hardware and communications budgets but smaller DP personnel budgets in the years ahead, according to B.C. Christensen, IBM World Trade Corp. vice-president and general manager.

In his keynote address at the 1978 Data Processing Management Association (DPMA) conference here last week, Christensen said falling DP personnel budgets will result from data entry moving outside the DP center, end users becoming more involved in applications development and increased DP personnel productivity through coming applications development tools.

The growth of hardware expenditures is a worldwide phenomenon, Christensen said. "The rule of the game is no longer to squeeze as much as you can out of a very expenisve piece of hardware through an extensive use of affordable manpower.

CW at DPMA

"It is, rather, to use less costly hardware and contain soaring manpower costs. The DP industry is the only one I can think of in which costs have consistently decreased while inflation was playing havoc with our economies," he said.

### Preserving Independence

A number of countries can preserve their independence in the face of economic instability only by subsidizing local DP vendors, he asserted, adding "these efforts . . . put a heavy burden on the national communities in direct subsidies."

In the future, telecommunications and computer technologies will merge, Christensen said, and superconductivity physics will provide "10 to 100 times faster circuits, consuming only one one-thousandth as much power.

"Bubble memories should allow cost-per-bit 10 times lower than silicon memory devices," he continued, "and access times that are 10 times faster than magnetic disk files."

### IBM's Organization

Christensen told the conference that IBM has made "a three-part division of the world."

IBM Corp. will serve the U.S. market, which accounts for one-half of the vendor's total revenues.

IBM Europe/Middle East /Africa Corp. has assumed "responsibility for IBM's business in 80 countries — from Norway's Cape North to the Cape of Good Hope, and from Greenland to Vladivostok." This enterprise accounts for about one-third of the vendor's total income, Christensen said.

Finally, the IBM Americas/Far East Corp. is "responsible for business in North and South America, excluding the U.S., as well as Asian countries to the east of Pakistan."

### General Business Group

There is also a "separate organization" called the General Business Group, which has been assigned office products and "small systems," he explained.

IBM executes research and development on a global scale to exploit local talent, allow scientists to remain in their home countries and avoid duplication of effort, he said.

However, manufacturing is organized on a regional basis to obtain economies of scale and uniform product lines, while gaining a degree of decentralization tailored to the local situation.

Marketing is conducted on a national level, Christensen noted, explaining, "It's clear that the country units know their markets best" and that, for example, "a German marketing rep can best deal with a German customer."

### Price/Performance Improvements

"Dramatic price/performance improvements and technological progress have brought down hardware costs to a point where new applications from the customer's backlog can be installed with an acceptable return on investment," he continued.

Demand for computer products has risen as a result, spurred also by "the sheer growth in volume among applications already in operation" as well as the expansion of applications to other areas of business.

A third reason for the climb in demand for DP goods and sevices is the proliferation of digital communications facilities. "The computer is no longer a sacred monster accessible only to the priests of the data processing religion. Everybody can now talk with it, work with it," Christensen told his audience.

He added that most computer activity tends to be concentrated in the first shift, when users are there. The need for backup systems and high reliability has risen, therefore, reflecting the increased on-line usage. Hardware demand has risen with the need for backup resources and high reliability, he concluded.

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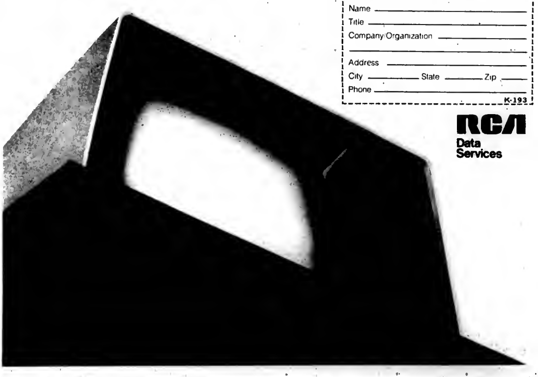

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# Calendar

Nov. 13, Tulsa, Okla. — **Meeting of the Southwest Computer Measurement Group (SWCMG).** Contact: Connie Smith, SWCMG General Chairman, Texas Department of Human Resources, John H. Reagan Building, Austin, Texas 78701.

Nov. 29-Dec. 1, Los Angeles — **Technical Documentation II Conference-Workshop**, sponsored by Graphic Communications Computer Association. Contact: Graphic Communications Computer Association, 1730 N. Lynn St., Arlington, Va. 22209.

Dec. 1, Palo Alto, Calif. — **California Computer Show.** Contact: Norm De Nardi Enterprises, 95 Main St., Los Altos, Calif. 94022.

Dec. 4-5, Washington, D.C. — **Understanding Proprietary Software and How to Buy It**, sponsored by Datapro Research Corp. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 4-6, Washington, D.C. — **Data Communications: Effective Network Design**, sponsored by Datapro Research Corp. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 4-6, New York — **Word Processing: Guidelines for Planning, Design, and Implementation**, sponsored by Datapro Research Corp. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 4-6, Chicago — **Increasing EDP Usage and Benefits Through Organizational Communications**, sponsored by Datapro Research Corp. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 4-6, San Francisco — **On-Line Systems Audit Controls**, sponsored by the Institute for Professional Education. Contact: The Institute for Professional Education, Suite 601, 1901 N. Fort Myer Drive, Arlington, Va. 22209.

Dec. 4-6, Washington, D.C. — **Applied Data Communications Systems**, sponsored by the Institute for Professional Education. Contact: The Institute for Professional Education, Suite 601, 1901 N. Fort Myer Drive, Arlington, Va. 22209.

Dec. 4-6, Washington, D.C. — **The Data Base Course**, sponsored by Management Resources International. Contact: Management Resources International, 6621 Electronic Drive, Springfield, Va. 22151.

Dec. 4-5, Palm Beach, Fla. — **CCIA Quarterly Meeting**, sponsored by Computer and Communications Industry Association (CCIA). Contact: Stephanie Biddle, Communications Director, CCIA, Suite 512, 1500 Wilson Blvd., Arlington, Va. 22209.

Dec. 4-6, Washington, D.C. — **ACM '78**, sponsored by the Association for Computing Machinery (ACM). Contact: Richard Austing, Department of Computer Science, University of Maryland, College Park, Md. 20740.

Dec. 4-6, Hartford, Conn. — **Computer Controls Course**, sponsored by the Greater Hartford Chapter EDP Auditors Association. Contact: Richard Carlson, Data Processing Audit, Travelers Insurance Co., 1 Tower Square, Hartford, Conn. 06115.

Dec. 4-6, San Francisco — **Conference and Exhibition on Small Computing Systems**, sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Department PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Dec. 5, New York — **How to Plan, Select and Manage Remote Computing Services**, sponsored by Evans Research Corp. Contact: Evans Research Corp., 1394 Palisade Ave., Fort Lee, N.J. 07024.

Dec. 5-7, London — **Compec '78**, sponsored by *Computer Weekly*, Data Processing and Systems International. Contact: Iliffe Promotions Ltd., Dorset House, Stamford St., London SE1 9LU, England.

Dec. 5-8, Wellesley, Mass. — **Leadership: Managing & Motivating EDP People**, sponsored by QED Information Sciences, Inc. Contact: Edpep Coordinator, QED Information Sciences, Inc., 141 Linden St., Wellesley, Mass. 02181.

Dec. 6-8, Philadelphia — **Data Base Management Systems: General Concepts and Planning Guidelines**, sponsored by Datapro Research Corp. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 6-8, Los Angeles — **Integration of Word Processing and EDP Systems**, sponsored by Datapro Research Corp. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 6-8, Chicago — **Computer Performance Measurement: Tools and Techniques for Increased System Productivity**, sponsored by Datapro Research Corp. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 6-8, New York — **Data Processing: An Introduction to Concepts and Systems**, sponsored by Datapro Research Corp. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 6-8, Washington, D.C. — **Distributed Systems: Are They Right For You?**, sponsored by Datapro Research Corp. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Dec. 7, New York — **Information Systems: New Perspectives for Management**, sponsored by Center for Information Systems Research, Sloan School of Management, MIT. Contact: MIT Alumni Center of New York, 50 E. 41st St., New York, N.Y. 10017.

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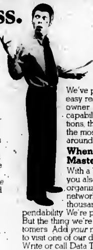

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# IIA's DP Audit Conference To Stress Optimal Methods

CHICAGO — The Systems Auditability and Control Conference will be held here Nov. 13-15.

According to the Institute of Internal Auditors (IIA), the show's sponsors, the conference will present "the most appropriate, effective and economical system and control techniques in use today."

The program features two tutorial sessions emphasizing DP audit techniques. The first is "Systems Auditability Practices for Auditors," to be conducted by Wayne P. Hauge and William B. Cornfield from Touche Ross & Co.

The second is "Control Practices for Data Processors," to be presented by computer audit consultant Frederick Palmer.

Several workshops and panel discussions will also be offered.

The registration fee is $295 for IIA members and $325 for nonmembers.

Additional information is available from the Conference Registrar, Institute of Internal Auditors, 249 Maitland Ave., Altamonte Springs, Fla. 32701.

# *Interface West 'Three in One'*

LOS ANGELES — Interface West, to be held at the Los Angeles Convention Center Nov. 14-16, is being billed as three conferences in one with programs on small business systems, microcomputer design and development and data communications.

More than 100 consultants, end users and educators will address 60 scheduled sessions at the conference. Twenty-three of the sessions will deal with hardware, software, services, administration and other aspects of small business utilization.

Nineteen of the sessions will investigate different procedures involved in the implementation and use of data communications with emphasis on distributed DP.

There will also be 17 sessions dedicated to the technical side of microcomputer design and development, including sessions on processors, memories, software and interfacing.

For the three days of the conference, the registration fee is $85 with a discount price of $50 for the third attendee (or more) registering at the same time from the same location and company.

For a single day, the fee is $50 with a discount price of $30, applying the same conditions stated above. For the exhibits alone, the fee is $10.

More information may be obtained from the Conference Registration Department, Interface West, 160 Speen St., Framingham, Mass. 01701.

# Cost Estimating Seminar Topic

HOUSTON — The Technical Marketing Society of America (TMSA) will sponsor an intensive two-day seminar on software cost estimating here Nov. 8-9.

The seminar is designed for software and financial managers responsible for directing, planning and costing software development projects.

The $325 course fee includes a copy of a collection of software cost-estimating information authored by the course instructors as well as tuition and reference materials.

Course instructors will be Larry Putnam, president of Quantitative Software Management, Inc., and Ray Wolverton of TRW's Office of Software Research and Technology.

For more information contact TMSA Seminars, Dept. SCE, P.O. Box 91295, Los Angeles, Calif. 90009.

# Course Covers Software Costs

SAN FRANCISCO — A five-day workshop in forecasting software development cost and schedules will be held here Nov. 13-17.

Sponsored by the Institute for Software Engineering (ISE), the workshop is recommended for management and technical personnel responsible for directing, planning and costing software development projects.

Emphasis will be on the application of a management technique for forecasting the effort and time necessary to complete complex software development projects.

The workshop instructor will be Larry Putnam, a consultant and president of Quantitative Software Management, Inc. of McLean, Va.

The course fee is $375 for ISE members and $625 for nonmembers. Additional information is available from the Institute for Software Engineering, P.O. Box 637, Palo Alto, Calif. 94302.

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# Mini/Micro Conference Opens This Week

HOUSTON — The nitty-gritty of minis and micros will be explored at this year's Mini/Micro Conference and Exposition Nov. 7-9 at the Astro Village Hotel here.

The conference will include 30 half-day sessions organized into seven themes. Scheduling has been arranged to avoid conflicts among sessions on the same theme.

More than 100 speakers will offer both formal papers and panel presentations to the estimated 6,000 to 8,000 attendees. Ten sessions will be held each day, with five concurrent morning and afternoon sessions.

In the areas of equipment, sessions will include "The New Generation of Fixed Disks," chaired by L.S. Bleininger of Microdata Corp. The session will review the alternatives available within the second generation of fixed disk drives.

Also dealing with equipment, "The New IBM-Compatible Minis — Markets and Applications" will present a forum for three industry leaders to discuss the recently introduced IBM 370-compatible minis, their architecture and where and how they will be used.

"How to Computerize a Small Business," chaired by Joe Glover of Electronic Data Systems, will address the major steps of such an endeavor. The session will deal with the elements of computer acquisition as well as analysis of examples of small business systems.

Another session for the mini/micro user will be "Keys to Success in Selecting and Installing a Minicomputer," led by John P. Gallagher, Data Systems Division of A.O. Smith Corp. The session will deal with the place of the mini in a business organization, implementation of the system, software selection and management and control responsibilities.

### For Vendors

For vendors, there will be sessions such as "Business, Entrepreneurial and Investment Opportunities in Minis and Micros." Session chairman will be Stanley Klein, editor-in-chief of *Mini-Micro Systems* magazine.

Speakers in that session will address emerging hardware and software opportunities for systems and software houses, entrepreneurs, individuals and small established companies. The session will also deal with investment opportunities for those wanting to support such activities financially.

In the technological area, "The Growing Impact of the Microprocessor on Computer Graphics" will be chaired by Carl Machover of Machover Associates Corp. In this session, a $30,000 interactive drafting system, several stand-alone graphics desktop computers, a high-performance vector-refresh display system, a laser high-speed automatic digitizer and a plotter and digitizer each costing about $1,000 will be described.

"Future Hardware Technology in Small Computers" will be chaired by Edward J. Bride of the desktop computer division of Hewlett-Packard Co. In this session, manufacturers and consultants will predict some forthcoming innovations in minis, micros and desktop computers in the next five to eight years.

Regarding software, "Pascal on Micros and Minis" will present a discussion of several implementations of Pascal, "the most widely acclaimed programming language in software engineering circles," according to the session chairman, Winsor Brown of General Automation, Inc.

"Approaches to Computer Network Troubleshooting" will provide a forum for the major vendors of protocol analyzers to clarify the basic differences among these products. The session will be valuable because "a mistake in choosing the proper diagnostic instrumentation could be competitively unwise, if not financially disastrous," according to session chairman Donald K. Wilkin of Hewlett-Packard Co.

The wares of more than 75 vendors will be on display at the exposition every day from 10 a.m. to 6 p.m.

Fee for the entire three-day conference and exposition will be $75 at the door. For one day of the conference and exposition, the charge at the door is $30. On-site fee for the exposition only is $5.

For more information, contact Mini/-Micro Computer Conference, Suite 1, 5528 E. LePalma Ave., Anaheim, Calif. 92807. (714) 528-2400.

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# Editorial

## Phase II and DP Industry

In certain respects, the DP industry should not fare badly as a result of President Carter's Phase II economic guidelines.

It will be relatively easy for vendors to comply with the price restraints set by the Administration. The DP industry has seen hardware costs drop over the last several years, and this trend is expected to continue. Although this drop has been offset by increases in software, systems support and maintenance costs, major DP vendors have vowed they will meet the guidelines.

The 7% ceiling on annual wage increases may be more difficult to enforce, however, since this is a high skill industry and good programmers, systems analysts, teleprocessing specialists and so forth are very precious commodities that usually go to the highest bidders.

While it would be un-American at this point to suggest that the wage guideline should not be applied to DP workers, imposition of the limits might have some disconcerting effects. Industrywide salary levels rose more than 12% during the 12-month period ending in mid-1978.

The application of Phase II guidelines could well blunt the economic growth of this industry and, as a result, cut back DPers' positive effect on the economy as a whole. Even though DP firms want to stop inflation, such a cutback would be undesirable.

However, it would be premature to predict that a limit on wage hikes will adversely affect the growth and vitality of the DP industry.

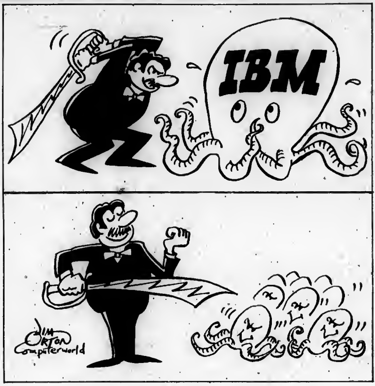
The DP balance of trade surplus has been a shining exception in an otherwise dismal deficit situation. DP systems are a very exportable commodity, and this outflow, even though small compared with some other segments of the economy (such as oil imports), has helped keep the overall trade deficit from being even worse than it is.

Another factor is less clearly understood, even by industry experts. But it appears that DP firms may be less susceptible to recessionary trends than others. To be sure, the recession of 1970 meant economic hardships for emerging DP companies, but a maturing, more sophisticated environment has meant DPers have suffered less in the more recent economic downturns.

This vitality has obviously been spurred by the need for DP products and the ability of small entrepreneurs to gamble with technological innovations. Even with a relative scarcity of venture capital in the past few years, an impressive number of new products have been introduced.

In short, the industry has been a powerful constructive force in an economy plagued by increasing inflation.

Nobody would suggest that the DP industry should be immune from Phase II guidelines. But at the same time, the positive aspects of this industry would seem to favor perpetuating the climate of economic growth that computer firms have enjoyed recently.



# Data Past

### Five Years Ago
### Nov. 7, 1973

WASHINGTON, D.C. — At hearings on proposed amendments to the Fair Credit Reporting Act, senators were told that Americans "should have an absolute right to know what secret intelligence information about them lurks in the electronically controlled data banks of the Medical Information Bureau [MiB]." John E. Gregg of the Policyholders Protective Association told the Senate committee, "Every American who has a health insurance policy or has contemplated the purchase of one should have a right to know if he is among those under electronic surveillance" by the MiB.

— — —

FORT WAYNE, Md. — Cynthia Crooks, who was found guilty of attempting to sell a service bureau's programs to a client of the service bureau, was sentenced to a one-year prison term, but the sentence was suspended. Police had charged that Crooks obtained copies of a service bureau's programs for a brokerage firm from her boyfriend, who worked as a computer operator for the service bureau.

### Eight Years Ago
### Nov. 11, 1970

EL SEGUNDO, Calif. — XDS announced the Sigma 9, designed for on-line commercial and scientific applications. The Sigma 9 continued the trend toward commercial user appeal the firm initiated in the Sigma 6.

— — —

NEW YORK — During scheduled running hours, the average corporate computer spends about 30% of its time on reruns and maintenance and in idle mode. Well-managed centers, however, spend only 19% of their time on these nonproductive activities. This was one of the conclusions reached by a study of the efficiency of 89 corporate DP centers using 155 computers conducted by A.T. Kearney & Co., management consultants.

# Letters to the Editor

### 'Circular' Solution

How odd!

Ken Lord [CW, Oct. 23] told us he wants banks to function much like public utilities, then proceeded to tell us that he got his knickers ripped by a bunch of banks acting much like public utilities. After all, when was the last time you got treated as an individual with sympathy and understanding by a telephone company, gas company or government agency?

His solution was equally circular. Precisely what is not needed is another stupid law telling someone else how to do business.

Remember, we might be next!

Oops, I forgot. He's the one with the vested interest in one of those certification programs who wants to pass a law requiring DPers to be certified. Now I see. . .

Sir, of the right and left doors leading to totalitarianism, you have once again taken the door on the right.

The solution to the problem of arrogance on the part of bankers is to pass a law doing away with all the laws that prevent real competition (as opposed to government sanitized) in the banking business. These are the laws that require all banks to be the same public utility-type operations, overburdened with government regulation and unwilling to treat you with much respect because you haven't got any place to go that's allowed to be significantly different.

David O. Blanchard
Santa Clara, Calif.

### APL Article Incomplete

As an avid proponent of APL, I am always glad to see *Computerworld* publish APL articles. There should be more.

The recent In Depth article "Why APL?" by R.E. Cook and A.J. Rose [CW, Oct. 23] was a fine presentation of the directness and simplicity of APL's ability to solve business problems.

However, the discussion of Scientific Time Sharing Corp.'s (STSC) file system was not a presentation of the general nature of the commercially available file systems. The detail discussed regarding STSC's file system clearly detracted from the earlier fine presentation of APL's simplicity.

In fact, other available file systems can be simpler to use than the one demonstrated. For example: CompuServe's enhanced version of Digital Equipment Corp. APLSF, or enhanced IBM APLSV offered by TimeSharing Resources and APL Services.

It would have been appropriate to discuss the general aspects of the APL file systems further.

Generally, the available file systems are component number-based. The component number is simply a reference for each record on file. The programmer can determine the appropriate component number in a variety of ways, including the position of a key in a table or by calculation.

This component number has no bearing on the physical location of the record on disk. As with the rest of the APL language, the APL file systems eliminate the programmers' need for the traditional concern regarding the record size, shape and data type.

A key reason APL has done so well in the business environment is that with only marginal additional coding and execution time it is easy to implement required specific features in a generalized fashion. This attribute makes APL an attractive development tool in an ever-changing environment.

Charles W. Terry
Manager, APL Products
CompuServe
Columbus, Ohio

### The Human Connection

## IBM, AT&T Nearing Home DP Face-Off?

**By Jack Stone**
Special to CW

From the *Washington Post* article "IBM Seen Ready to Enter Home Computer Field" [Oct. 11]:

"IBM . . . is currently prototyping a low-cost personal computer suitable for the consumer market, say informed industry sources . . .

"There is a consensus that if IBM will introduce a personal computer, it will do so within the next 24 to 36 months . . .

"IBM faces potentially stiff opposition in the personal computer market . . . However, IBM's major concern is with AT&T and many industry people feel that the home computer will turn into yet another battleground for the two corporate behemoths . . .

"By virtue of the phone network . . . AT&T has an inherent advantage over IBM in establishing a personal computer market. Technology available to the phone company would allow it to modify phone terminals into microprocessor-based personal computers . . .

"IBM is thought to be building a keyboard with a microprocessor . . . that can be hooked up to a television set . . . Videodisks would offer a memory storage facility. . . . "

— — —

The time: A quiet evening sometime between 24 and 36 months from now.

The scene: The serene living room of Martha and Morris Diamond. Morris is reading about the latest happenings on Wall Street, when the front door bell rings and in walks Howard Adams, their IBM neighbor.

"Howie, I don't recall seeing you so dressed up. Is that what they call a 'Madison Avenue' three-piece suit?"

Adams was, of course, ready with snappy comeback number 73. "Actually, I was trying it on for my daughter's wedding. I saw your lights were on so I thought I'd stop by and join you at the TV set."

He then executed attention grabber 128: he made sure that the mainframe fell out of his coat pocket and bounced along the floor as he walked across the room.

"Hey, you dropped your cigarette case!" Morris cautioned.

"Oh, no, that's not for cigarettes," Howard replied as he retrieved the machine. "It's just my personal computer."

"Wow! What can you do with it?"

"Oh, study trends and statistics of the stock market, for example. Of course, my personal data base" — he flashed a three-inch disk in front of Morris's eyes — "is limited to stocks on the major exchanges for the past 25 years. But if I need more history, I can dial up a machine that can give it to me. It's our new Nice, short for National Interconnecting Computer Environment. Say, come to think of it, you follow the markets, don't you?"

"Do I ever! How do I get one of those?"

"No problem. I'll get one of our system engineers over to do a study of your DP needs, build you a five-year plan and show you how your needs can be satisfied for a DP budget increase of only 15% per year. Meanwhile, let's turn on the TV and I'll give you a demo."

### Scene II

The next morning, Martha was busy cleaning the foyer when the doorbell rang.

"Why, Gary Nunn, what brings you around these parts? And how come you're wearing that fancy plaid shirt? And those new blue jeans?"

"Howdy, Mrs. Diamond! Just want to make a routine check of the lines. Our central office folks told me to see if maybe some squirrels loosened up some wires."

Nunn pulled a small display/-keyboard device out of his pocket, attached it to the handset and turned up the volume control. A voice was heard to say, "Only when fresh-chopped walnuts are liberally added to your fudge brownie mix will . . . "

"Gary, what was all that?"

He turned down the sound and said, "Oh, I was just checking the lines with one of our new offerings. We call it Nice, short for National Interconnecting Communications Environment. You just dial up one of many numbers and out comes all the information you need to know about the kitchen — menus, grocery lists, appliance maintenance information, just everything. One of our consultants can come out to explain what we can do for you."

That evening, the Diamond family held its first meeting on its requirements for DP/data communications support and how it was going to select a vendor.

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### Reader Commentary

## Adapso, Afips D.C. Move May Cure Cash 'Problem'

**By Joseph T. Rigo**
Special to CW

Two of our leading DP associations are moving their headquarters to Washington. This is only natural. Where else would a group go when it wants to learn how to get rid of large amounts of money quickly?

The groups are the Association of Data Processing Service Organizations (Adapso) and the American Federation of Information Processing Societies (Afips).

Adapso's members are corporations, mainly computer service bureaus, software vendors and professional service consultants. Adapso's formal mission in Washington will be to argue for fewer and lower taxes for these companies.

Afips is a collection of professional societies, such as the Association for Computing Machinery (ACM) and the Data Processing Management Association (DPMA). As such, its members are individuals. Afips will press for bigger and better research grants for computer scientists.

Both groups currently have their headquarters in Montvale, N.J., a pleasant suburb about an hour's drive from New York. They are the main tenants in a small office building near a parkway exit.

### Part of a Trend

Their move to Washington is part of a trend. All of the big associations are doing it. It helps them solve their biggest problem: getting rid of cash.

In earlier days, these groups centered in New York. Their role was primarily public relations, and New York was the communications center.

An association could take a writer or broadcaster to lunch. Within a short time, if the group was lucky, its message would be circulating throughout the country in the form of a magazine article or a television special.

Times changed. The associations moved to the suburbs. And they got efficient. They found it was easier to work directly with members of Congress than to try to influence public opinion.

Also they got very rich.

This last point made them appreciate their Washington operations even more. Washington can be very expensive.

This is especially important to a group like Afips, which has been one of the big winners. Afips sponsors the National Computer Conference (NCC) every year, and its profits are enormous.

### Afips' Philanthropy?

Afips has to give away most of its income to its member societies, but those societies don't know what to do with it either. ACM, for example, is papering its walls with Certificates of Deposit worth a half-million dollars each.

Adapso is younger and has not yet

(Continued on Page 22)

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### The Taylor Report

## Model Letter Clarifies Audit, Managerial Roles

**By Alan Taylor**
Special to CW

At the moment, DP auditing represents one of the fastest growing areas of our profession. The New England chapter of the EDP Auditors' Association is not yet three years old but has more than 150 active members.

While I was attending its October meeting, the president, William Coady of MIT, was receiving new members who had just been told by management to set up "DP auditing"; they were wondering what a DP audit was.

A central issue in many discussions I have had with practicing DP auditors concerns their work role and how they can effectively communicate with management about their activities.

Even when auditors discover errors, their relationship with management tends to remain civil. In that case, the conflict is between the employee responsible for the error and management. But when the auditor finds out something and wants to put it into the audit report, there's the rub.

### 'Illustrative Letter'

Until about a decade ago, there was little the financial auditing profession could do about this problem. However, about 1970, a new concept became generally accepted. A written letter to be drawn up by management and the auditor clearly sets forth the purpose of the audit and who will be responsible for getting the accounts straight.

Earlier this year, the "Management Representation Letter" won formal approval from the American Institute of Certified Public Accountants. The "illustrative letter" published in an appendix to the association's consolidated "Statements on Auditing Procedures" provides a clear guide: all DP auditors should have it in their private files.

The letter begins with a definition of the auditor's task. "In connection with your [the auditor's] examination of the [identification of financial statements] of [name of client] as of [date] and for the period of examination [dates] for the purpose of expressing an option or whether [the consolidated financial statements] present fairly the financial position, results of operations and changes in financial position of [name of client] . . . "

I think you will agree the letter is precise, yet covers a wide area. It is an easy letter for management to draw up when it needs an audit on, for example, an inventory control system.

It takes no more than a few minutes to draft such a paragraph. For example: "In connection with your examination of the XYZ Payroll System of our corporation as of Jan. 1, 1978 as it has worked since its installation on June 7, 1977 for the purpose of expressing an opinion on whether the installation

(Continued on Page 22)

# Model Letter Helps Clarify Auditors' Role

(Continued from Page 21)

manager's monthly reports present fairly the financial position, future progress and comparison with the original specifications approved by management a year ago last Michaelmas. . ."

Well, perhaps it wouldn't go quite like that, but you get the idea.

Next, the letter proceeds to the heart of the matter. Who or what is responsible for the accuracy of the accounts? Is it the auditor, the DP department or the user?

It is essential that this point be agreed upon by the parties before the DP auditor writes and signs his report. Otherwise the audit will rest on a weak foundation just when it needs every ounce of strength.

The second paragraph of the letter begins, "We [management] are responsibile for the fair presentation [of the balance sheets] . . . " — which clears up the responsibility issue nicely. A series of points that must be thoroughly evaluated by the auditor, *even when everything is obsolutely perfect* follows:

- Data made available to the auditor.
- Irregularities involving internal accounting personnel — and others — or letters from regulatory agencies.
- Future plans and intentions that could change values.
- Financial institutions, "related part transactions" and other special arrangements.
- Contingent losses or gains and related possible law and regulation violations.
- Claims and probable claims known to the corporation's lawyers.
- Reduction of inventory value to realizable level.
- Title on all assets, lack of liens, encumberances and pledges.
- Losses resulting from contracts already in-house which cannot be completed at a profit.
- Adherence to contracts.
- Nothing changed since the period under examination.

And, most important, "There are no material transactions that have not been properly recorded in the accounting records underlying the financial statements."

Read that statement a few times. In effect, it is a blunt claim from management that everything necessary has been taken under proper consideration. Only management, never the auditor, can be sure about this. The integrity of the audit depends on this point.

### Audit Task Clarified

DP auditors who make use of the illustrative letter in their work can expect the audit task to be clarified considerably. What is it that they are being asked to do? Should they redo the work of the project leaders or should they see if the project leaders' reports are complete and accurate? Should they see if the vendor contracts are being complied with?

And if they are misled by someone, and the accuracy of the audit report is questioned later, then who is responsible for the resultant inaccuracy? Would it be the person or the department who did the misleading or the auditor who was taken in?

Hopefully this discussion has somewhat clarified the role of the DP auditor. Setting forth duties and responsibilities before the audit begins should ease the communication problem that often develops between DP auditors and management.

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# Associations' Move May Help Solve Cash Trouble

(Continued from Page 21)

found a comparable money tree. Still, it manages to do quite nicely with its two or three smaller conferences each year.

The rise of wealth has not been good for the people who work for these associations. They are trained in public relations. They are at their best when they are entertaining people and spreading the association's message.

Instead, they sit in their Montvale offices, stuffing money into the closets and watching cars go by on the parkway.

The trouble is that Montvale lacks proper facilities for big spenders. There is no way you can spend more than $15 a person for lunch at the Ramada Inn across the street, and the wine list there is atrocious.

Afips and Adapso could move back to New York. But there is no point in taking a writer to lunch in an age when people have given up reading. And no one even dares to suggest a meeting to discuss computers with Walter Cronkite.

So Washington is the place. The town is swarming with Congressional assistants who are constantly hungry. You can take any of them to lunch, and no one will ever question the expense account.

You have to admire them in a way. Congressmen may not be the brightest people around, but they keep in touch with their local papers. They see computer company stocks going up, and they see those recruiting ads offering system programmers $35,000 a year.

Afips and Adapso are setting out to convince these guys that we are a bunch of poverty cases, and the industry will collapse unless we get better government subsidies.

They will have a tough job. Fortunately, it will be very expensive.

*Rigo is president of Sysdoc, Inc. in New York.*

# Letters to the Editor

## Martin Books Available

Readers might like to know that Jim Martin's book, *A Special Report on Computer Networks and Distributed Processing* [CW, Sept. 25], and his most recent two hardcover books, *Communications Satellite Systems* and *The Wired Society*, are available from the Telecom Library at 205 W. 19th St., New York, N.Y. 10011.

Harry Newton
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## *Gets Everyone Involved*

# Prototype Seen Easing Use of DBMS

**By Don Leavitt**
CW Staff

MUNICH, W. Germany — Many installations begin to work with data base management systems (DBMS) by using the technology with one particular application, but that may not be the best way to do the job, according to two researchers who recently outlined a different approach.

Frank F. Kowalkowski of A. T. Kearney, Inc. and Ellen C. Rundquist told the Sixth International Adabas Users Conference, held here in mid-September, about a company that used a prototype approach to introducing the potential of Adabas, the DBMS from Software AG.

This approach exposed company personnel at all levels — from top management to DP technicians and data entry clerks — to the system, including give-and-take discussions of the way the prototype was developed and how it worked, the researchers said.

The company involved in the case study was "a member of the services industry" that was getting away from a batch-oriented "IBM 360 generation" environment. The prototype was envisioned as a means of cycling through, on a small scale, the entire DBMS procedure for developing an on-line system.

Offering facilities to people throughout the organization, rather than the limited audience that might utilize a specific application, the prototype operation involved defining a limited data base, the relationships between the elements, how it can be used and how well the system performs.

In particular, Kowalkowski and Rundquist noted, the approach provided management with proof of the concept's credibility, confirmed the choice of Adabas as the DBMS and showed users and project staff how to work with the on-line facilities.

But it also allowed the implementors to accumulate performance data on such things as run-times and the scale of programming effort required.

In addition, it gave management the opportunity to try specific terminals and see for itself what applications would be most appropriate for the production implementation.

Initially the project was oriented toward technical performances with high-volume, in-depth testing but was reshaped, after management review, to place emphasis on testing in breadth to evaluate the data base concept and its adaptability to the business environment of this particular company.

Project business analysts developed six prototype scenarios or mini-samples of the kind of work done by the user areas in the course of normal service operations. A list of data elements needed to perform the scenarios and to allow users to experiment with inquiries or to browse through the data base were compiled.

The proposed prototype data base was to consist of 200 elements and 10 files generated within four weeks of software AG training. In reality, the data base had 180 elements and 15 files and it took six weeks to complete, partly because of the

*(Continued on Page 25)*

# VAX at Heart of Workbench

SANTA MONICA, Calif. — A system incorporating Digital Equipment Corp. VAX-11/780 hardware with Bell Laboratories' Programmers' Workbench (PWB) and Unix operating system software has been introduced by Interactive Systems Corp.

Designated the VAX Workbench, the turnkey system supports large-scale software development and documentation projects. But when not being used for that, the hardware can be used as any other VAX CPU, a spokesman said.

In addition to the software available in the basic Unix package, the VAX Workbench can include a screen-oriented text editor, compilers, comprehensive text editing facilities and a source code control system. An integrated electronic mail system further eases development by supporting interoffice communications, the spokesman noted.

### Basic Hardware

Basic hardware for the workbench includes a 256K-byte VAX-11/780 with a 67M-byte disk drive, a tape drive and an 8-line multiplexer for use with Interactive's Intext, an intelligent 9,600 bit/sec video terminal specifically designed for text editing.

Software includes DEC's VAX/VMS virtual memory operating system, which is said to give multiple users direct addressing to 4G bytes of memory. DEC's standard Fortran IV Plus, VAX-11 Macro, Basic-Plus-2 and PDP-11 Cobol are also available as no-cost options.

The VAX Workbench software package integrates the tools of Unix and PWB/Unix into the VAX/VMS environment. These tools include the Unix Shell command-language interpreter; "C," a block-structured programming language; and YACC — Yet Another Compiler-Compiler — a general-purpose language specification tool.

The turnkey operation can support as many as 48 programmers concurrently and users can both create and document large programs for execution on large-scale target machines accessed through remote job entry facilities, the spokesman asserted.

The hardware in the Interactive package typically costs about $250,000, while the software starts at $75,000 for a basic Unix subsystem and climbs to $90,000 for a typical installation, he added from 1526 Cloverdale Blvd., Santa Monica, Calif. 90404.

# DG Enhances Software on Eclipse

WESTBORO, Mass. — Data General Corp. has enhanced the software capabilities of the Eclipse data system family.

An automatic segmentation facility for the firm's Cobol permits the operation of extremely large programs, while enhancements to Infos file management software broadens its use to applications written in the PL/I, Fortran 5 and DG/L languages, a spokesman said.

Running under DG's Advanced Operating System (AOS), the Cobol compiler complies with the Ansi 1974 standard, with all implemented modules at the highest level. The segmentation facility allows the execution of very large programs, whose memory requirements exceed the normal memory addressing capacity of Eclipse systems, the spokesman explained.

AOS Infos is a data base-oriented file management system that provides multiple-keyed access to information in a multiple terminal, batch or communications environment. The current extensions permit access to these data bases for applications written in PL/I, Fortran 5 and DG/L.

"With these facilities, our users may choose from an extremely broad range of high-level languages, to select the one that best matches each application's requirement," the spokesman continued.

Support for access to the data bases through Cobol, RPG-II, Assembler and DG's Interactive Data Entry Access System (Ideas) was already in place and continues in addition to the support being introduced at this time, he explained.

AOS PL/I is based on the Ansi 1976 PL/I standard.

AOS Fortran 5 produces highly optimized code for fast runtime execution. Unlike many other compilers, which optimize only within single statements, Fortran 5's compiler optimizes globally across the entire program as well as locally within statements, DG said.

DG/L is an Algol-derivative structured programming language designed for a wide range of applications. DG/L is an ideal development tool for systems-level software such as compilers, assemblers, sort/merge and other utilities, the company claimed.

AOS Cobol carries a one-time fee of $4,000, while AOS Infos costs $2,000, DG said from its headquarters on Rt. 9, Westboro, Mass. 01581.

# 'UCC-42' Models IMS Data Bases

DALLAS — The UCC-42 data base modeling system package, now available from University Computing Co. (UCC), was designed to operate as a utility under all versions of IBM's IMS/VS data base management system, according to a spokesman.

The package is a facility to provide applications and data base administration personnel with practical answers to theoretical questions about the design of their IMS data bases, he said.

Because it functions without modifications to existing systems, UCC-42 provides a capability by which users can investigate alternatives that might otherwise be ignored, the spokesman asserted. It can be used to design a new structure or to ascertain the impact on other applications if a structure has to be changed, he said.

The utility runs in batch mode, extracting data from production data bases according to user-specified criteria and inserting the data in a predefined model.

Thus, UCC-42 allows for the restructuring of data bases, the manipulation of segment types within a structure, the breakdown of large structures into smaller ones and the modification of segment lengths, he said. The package can handle physical and logical data bases, he added.

Initial users have commented on UCC-42's ease of use and the "dramatic" reduction in manual effort required to create and maintain accurate model data bases, according to the spokesman.

Written in Assembler, the package reportedly requires no changes in the user's software. It takes 10K bytes of memory plus the space needed for DL/1 and buffers, and it costs $4,200.

UCC is at 8303 Elmbrook, P.O. Box 47911, Dallas, Texas 75247.

## For Networks, Queries

# 'Expand,' 'Enform' Enhance Tandem Facilities

CUPERTINO, Calif. — Tandem Computers, Inc. has added software and networking capabilities to its multiple-processor systems to allow users to link as many as 255 "geographically dispersed systems."

The added capabilities, called Expand and Enform, allow sites with Tandem CPUs and data bases to be linked together into four-wire private-line or X.25 packet facilities. Traffic on these nets is handled with the aid of data base directory information that is stored at each system site in the network, the company said.

Expand allows inquiries to be routed automatically to data that resides at remote sites using the best path available, but this capability relies on previously programmed data in the system which defines the location of application programs, a Tandem spokesman noted.

### Other Features

As part of the Expand capability, the Network Control Process feature allows network links to be reconfigured in the event of malfunctions in specific network connections.

Computing resources and data bases in an Expand network are said to be location transparent to operators and programmers. In addition, a program resident in any system in a Tandem network can access data resident in any other system. But these features depend on directory data available at each multiple-processor system site.

Tandem also introduced its Enform software, which allows retrieval of data from multiple files in ways not anti-

*(Continued on Page 30)*

# 'Tiger' Enhances ICL 1500

E. BRUNSWICK, N.J. — ICL, Inc. has introduced an entire range of modular accounting application packages in support of broader use of the company's Series 1500 "Little Tiger" small business computers.

The systems were originally introduced early in the 1970s and despite the availability of Cobol, Basic and Business Transaction Language (BTL) support and communications software, have been used primarily as data entry systems, a spokesman explained.

With the introduction of Total Information Gathering and Execution Reporting (Tiger) software, more users should become aware of the systems' true processing capabilities, he said.

Tiger software currently includes modules for accounts receivable, accounts payable (including sales analysis), invoicing, general ledger, inventory control, order entry, client accounting and professional time accounting, the spokesman recounted.

The 1500 Little Tiger hardware — consisting of a CPU, keyboard, CRT, disk subsystem and printer — costs less than $20,000, and additional or remote data entry stations are available for $5,000 each, he noted.

The Tiger software is available at $1,000 per module, or all seven modules may be purchased as a package for $5,000, ICL said from Turnpike Plaza, 197 Highway 18, E. Brunswick, N.J. 08816.

# NCR Cobol Validated

DAYTON, Ohio — The Cobol compiler supplied by NCR Corp. with the Virtual Resource Executive (VRX) operating system for the company's V-8400 and V-8500 systems has recently been exercised by the Federal Cobol Compiler Testing Service.

The validation disclosed only a "few discrepancies" in the "several thousand" features tested, indicating an "exceptionally high" degree of conformance with the Federal Information Processing Standard, according to NCR.

The validation program was developed several years ago in order to confirm that compilers being brought into the federal inventory did, in fact, comply with the American National Standards Institute specifications for the language — or to show where they failed to meet those "specs," an observer added.

NCR's Cobol compiler was built to the 1974 Ansi specifications and intended to operate under VRX, which the company said is capable of handling 35 programs at the same time.

# XCS Program Controls Distributor Inventory

LOS ANGELES — A Planned Inventory Management (PIM) service now available on the remote computing network supported by Xerox Computer Services (XCS) should allow distributors to set customer service levels and meet them with minimal inventory investment, according to an XCS spokesman.

Described as especially useful to large distributors maintaining extensive inventories, PIM produces monthly reports including a forecast of demand for each item, a list of order points, economical order quantities and a tally of items below order points.

The system also simulates cost effects of possible inventory policy decisions before they are made, the spokesman said.

A requirements planning program is also included to provide aids for such things as cash flow projections and replenishment planning for product introductions or special promotions, he added.

PIM and other distributor-oriented services are available nationwide on the XCS network.

Costs are related to use of the networks resources, the company said from 701 S. Aviation Blvd., El Segundo, Calif. 90245.

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# BCS Introduces Extensive Engineering Support

MORRISTOWN, N.J. — Apparently reaching back to its roots in the aerospace industry, Boeing Computer Services, Inc. (BCS) has introduced its Engineering Emphasis line of 24 engineering software packages along with staff support and the hardware capabilities of a multiple Control Data Corp. Cyber 175 configuration.

The software includes the first offering of Georgia Institute of Technology's improved version of the Integrated Civil Engineering System Structural Design language; a large-scale, three-dimensional, finite-element analysis program called Ansys; and a medium-sized finite element structural analysis program called E³SAP, a spokesman noted.

Other packages in the new library, all available on BCS' Mainstream — EKS remote-computing service, include a MacNeal-Schwendler Corp. version of the Nastran structural analysis program originally developed by the National Aeronautics and Space Administration, and Tpipe, a comprehensive piping stress analysis program also based on finite-element analysis.

The Engineering Emphasis products are complemented by interactive graphics capabilities that allow the engineer to review his model quickly and evaluate results for real-time decision purposes, the spokesman continued.

In addition to the five core products, the BCS engineering library includes 19 other programs currently used by structural, civil and mechanical engineers. For structural design and analysis, for example, there are packages that perform static, dynamic, buckling, heat transfer and nonlinear analyses, he said.

For general civil engineering, there are packages that perform hydraulics, hydrology, soils and surveying analyses. Graphics support products include interactive graphics, reports and graphs and the geometry of structural systems, the spokesman continued.

Although there is a surcharge for use of the products that are not BCS-developed, those costs are built into the charging algorithms, BCS said from 177 Madison Ave., Morristown, N.J. 07960.

# Sample Aids DBMS Start

*(Continued from Page 23)*

shift in emphasis sought by management while the work was under way.

The project team was satisfied that all Adabas features that were tested performed as anticipated. The prototype was not an exhaustive test, but it was sufficient to confirm that the system would function as advertised, Kowalkowski and Rundquist said.

### Response Time Variance

Response times varied greatly, they said, depending on the number of Adabas files needed to fill out a screen of data. The target was set at less than 10 seconds per screen and initial times were in fact as high as two minutes. But, the researchers noted, the prototype environment was good for tuning, without the pressures of a production system, and the times came down "nicely."

Some improvement was expected in programmer performance over conventional rates of 2,000 to 8,000 documented lines of code per year per person. In fact, approximately 7,500 lines were written during a three-month period by two programmers.

On the other hand, the researchers warned their audience, the development team realized that the success of the prototype did not by itself guarantee the success of a production system.

The possibility of converting the prototype to an elementary operational system "poses a clear and present danger" to the company. Among other things, special cases had not been accounted for; staff resources would be diverted from the target system to develop the extended prototype; ad hoc procedures, good enough for the prototype, tend to become institutionalized; and the system will eventually fall into disuse because it was not designed to be responsive to all the major applications that might be imposed on it.

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## *Now Growth Taxes Hardware*

# User Finds Way to Ease On-Line System Work

Special to CW

BOISE, Idaho — Although the Idaho State Tax Commission is no stranger to DP, it entered the on-line world in April 1977, when work began for coding and making operational an IBM CICS-based income tax processing system by Dec. 31, 1977. This deadline was crucial because tax returns had to be processed starting Jan. 1.

The commission chose to use the State of Nebraska Income Tax Processing system as a model, and the DP group, headed by Richard Ford, set about adapting that system to Idaho's specific needs.

Programming on the system was started in mid-September 1977, but projections by both IBM and the Idaho Auditor's Office soon indicated that the projected deadline for on-line programming would be exceeded by at least 30%, which would effectively mean putting off the application for another year, according to Steven Sanderson, the analyst in charge of on-line work for the commission.

Contract programming was investigated around Oct. 1, with the hope that outside help might still allow the commission to make its deadline. In the meantime, the programmer's work week increased to 50 hours a week and more.

It was around this time that Sanderson became aware of User Files On-Line (UFO), a real-time CICS application development system from Oxford Software Corp. that Bob White and his systems programmers for the State Auditor's Office had been considering.

Since the 370/158 at the Auditor's Office was to serve as the processor for the income tax system, Sanderson agreed to take a harder look at UFO, which led to the decision to order the software and see if it could make the system fly by Jan 1.

Starting from ground zero in early December, Sanderson started to reprogram the entire system himself, using UFO. He had it up and in use by Jan. 15. Although the completed data collection and verification system was 15 days late and the operators had to hustle to catch up, Sanderson said he was "supersatisfied" with the results, especially since he had never heard of or used UFO before.

### Companion System

With the basic bottleneck passed, Sanderson set about creating a companion system for on-line updating and inquiring against the 300,000-record income tax master file, which had previously been a batch process. Now better acquainted with UFO, Sanderson completed his task one month later, in mid-February, and turned the system over for immediate use.

Idaho has the seventh largest population growth rate in the U.S. today, and Sanderson said that growth has been reflected in a 25% annual increase in new tax records and name and address changes, making on-line inquiry and maintenance a necessity for servicing the citizens of Idaho on a timely basis.

### Financial Benefits

More than 3,000 transactions a day are handled. Needless to say, the faster, more accurate processing has been financially beneficial to the state itself.

As of today, the on-line income tax processing is accomplished through 15 IBM 3277 CRTs located at the Tax Commission Offices in Boise, with an additional six CRTs in the various field offices.

Sanderson is an enthusiastic UFO advocate at this stage and has used the package to create application programs in other tax areas as well. He feels it has been a major factor in allowing the commission to meet its objective of getting on-line with as many applications as are needed and feasible. "I can get a simple inquiry up in one-half hour now and a full-blown display and update in a couple of days. With that kind of responsiveness, I can service the growing needs of the commission almost instantaneously."

Because of the success at the Tax Commission, the Department of Finance and the State Auditor's Office have also become enthusiastic users.

### Not Without Cost

The increased use of CICS and UFO hasn't been without cost, however. The on-line growth has accelerated the saturation point on the 370/158 MVS to the point that a significant upgrade or a second machine of comparable size will probably have to be ordered a year ahead of schedule.

Currently, the machine configuration at the State Auditor's Office consists of two 3330 spindles, eight 3350 spindles, a 3850 mass storage device, a 3886 optical character recognition device, five tape drives (3420 models III and IV)and two 1403 printers.

In addition to its 370 operation, the Tax Commission operates an IBM 3600 financial system to manage the flow of cash collections on a daily basis. Because of the success of the 3600 data-collection operation, the Tax Commission is also considering off-loading much of the data entry from the 370 onto a mini system and using the 370 primarily for inquiry and update.

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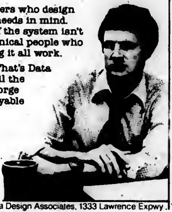

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BILLINGS

# Data Base, Communications Lead ASI Courses

**J. Daniel Couger On Education**

Last week Advanced Systems, Inc. (ASI) held its 10th anniversary professional training conference in Chicago.

A large number of videotape modules on a variety of new courses were displayed at the conference. The most important, according to Rohit Patel, vice-president of product development, is the advance information technology (AIT) curriculum.

Initial modules are available in each of the seven courses within this new "whole curriculum concept": database, data communications; distributed processing; networks; mini/micro hardware; on-line applications; and structured technology.

"Deriving Logical Data Relationships" was the module on display from the data base course, and "Design Factors Affecting On-Line Transaction Processing" was the module on display from the distributed processing course. Other new course modules displayed included NCP-VS concepts, structured analysis, Cics/VS, JES2 and JES3 dump improvements.

Other speakers (and topics) included Robert Wainwright (distributed processing), Gary Richetto (interpersonal relations), Ken Orr and Chris Gane (structured techniques), Dave Benenati (human resource management), Nate Newkirk (systems training) and Pat Coleman (transaction analysis).

### Who Leads A/V Industry?

Thomas A. Duerden, president of ASI, and Patel visited me recently in Colorado Springs to "bring me up-to-date on the ASI situation." Duerden took exception to some figures in my recent column on sales and size of product lines of companies in the DP audiovisual (A/V) training field. In that column, I quoted Robert King, president of Deltak, saying his company would reach $20 million in sales this year and, therefore, would be Number One in the A/V industry.

"Last year we had sales of more than $13 million, and this year we will hit the $20 million mark," Duerden said. Because ASI is a division of URS, sales data for its operations is not public. The Domestic Sales Division now totals 120 people located in 17 offices.

In the international marketing division, there are 30 ASI employees and an additional 18 distributors servicing clients' needs in 70 countries. The product development staff now numbers 42 people, consisting of course developers, producers, editors, graphic artists, studio technicians and word processing typists.

Duerden reported that "over the last 12 months, ASI has released 186 videotapes; 129 were Internally produced by ASI, 57 were from acquired courses."

ASI is big in foreign language translation. "To date, we have 155 videotapes available in Spanish, 12 in Japanese, 222 in German and 33 in French." In addition to translating the videotapes in courses, all supportive material such as student guides and coordinator guides are translated.

According to Duerden and Patel, ASI has a number of "firsts" in the industry, which include the following:

- First to use video-assisted instruction (VAI).
- First to offer a multimedia course.
- First to use interactive video.
- First to combine VAI with

(Continued on Page 32)

# 'Baysys' Eases Library Chores

SAUSALITO, Calif. — An enhanced release of the Baysys software library and development system from Glosser Software Associates is said to make maintenance of programs and other card image data even easier for IBM DOS and DOS/VS.

The package automates the management of installation software," a spokesman said, explaining that with Baysys in place "many of the restrictions" of batch program library systems are eliminated.

Any type of instruction can be intermixed in the run stream and MOVE and COPY instructions facilitate program development, he noted. Multiple library support enables users to physically separate systems without loss of interaccessibility, he claimed.

Other important features, according to the spokesman, are a dynamic library space management facility that does not require partitioned data set-type compression; user password protection; multiple global character string replacement; and the maintenance of a history file to track what changes have been made over time.

The package costs $2,500, Glosser said from 625 Locust St., Sausalito, Calif. 94965.

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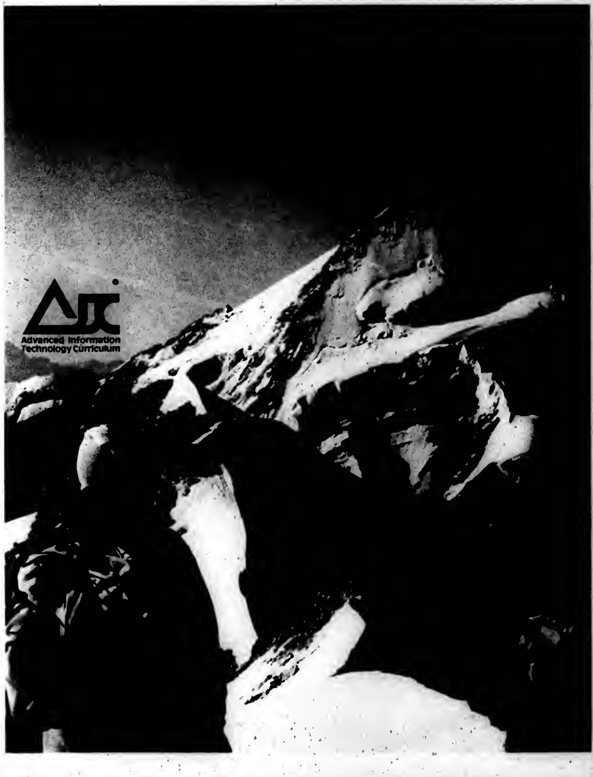


## *Ex-DP Professional Wonders*

# Tribulations of DBMS: Is It Really Worth It?

**By Jake Kirchner**
CW Washington Bureau

So you're a DP manager and folks upstairs get the idea that developing a comprehensive data base would be a great thing for the organization. Just thinking of all that good information a few short programs away is making them dizzy with anticipation.

Just hope it isn't Monday when you get the call.

Of course, they say, they'll do the coding and hire the extra keypunchers. Of course they'll cover all the expenses out of the executive budget. All they want, they say, is the use of a programmer now and then, and probably only after the data base is complete, and they only need an occasional, simple, straightforward run, whatever that means.

So of course you give in; what else can you do?

Well, what can you do — and what you had better do if you're to have any future in that shop — is to disabuse the folks upstairs of some of those fanciful notions about the simplicity of compiling and using that data base, let alone *updating* it.

Because, after all, that's the key. The really big headache is keeping the data base updated. Who is going to do it? Is there going to be a continual line in the budget for this task? (When you read "continual," think "forever," because a good data base is like a good marriage.)

The basic considerations in putting together your own data base are the same as in every other DP project. It has to be planned carefully, and it *must* have the backing of upper management. It does not matter whether the senior accounting staffers are eager to put together a computerized costing system if the comptroller has no interest in it, won't support it and won't let his staff spend time updating the darn thing.

Sure, it's flush now that there is a lot of big talk and even bigger money floating around, possibly including government grants if your organization qualifies for that kind of help. But what happens when that grant money runs out (it always does sooner or later, no matter what you've heard about government spending) or when the economy slows down?

The painful truth of the matter is that your fancy new data base might very well be the first thing to go. The reason is simple: The people who make the final budget decisions almost never understand data processing, let alone the importance of updating the data base for which they pushed.

They have a mental picture of a completed system. Once it's set up, they think, it will last forever. And when the budget is tight, their thinking on updating data bases is, "Why can't it go for another six months without really getting out of date? We'll get to it then."

So ask how important this thing is. How high up is it backed? How often will it be used? Is there a real commitment to this project, or is it just a whim of some middle management "genius" who thinks he knows "all about computers"?

Management clout — that's the thing. It's especially crucial when the data base is to encompass information from several or many or even every (talk about ambitious) department in your organization ("Think of the interface possibilities!" they say).

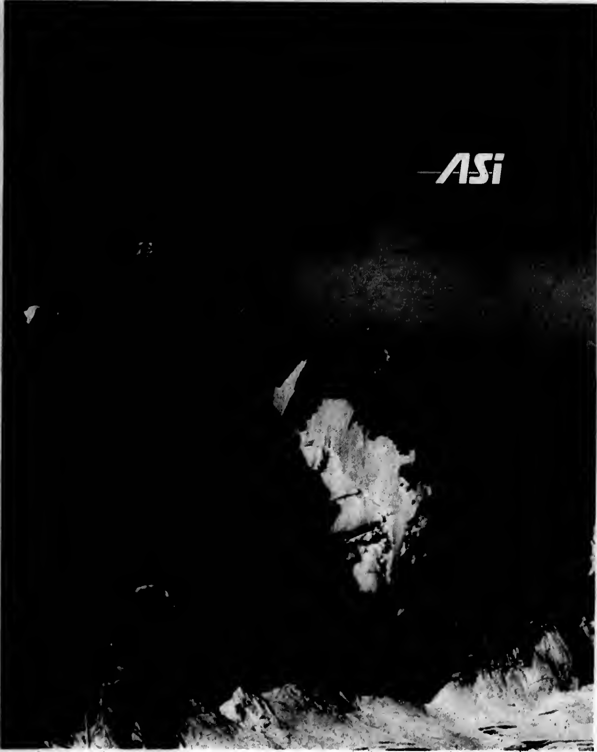
What will happen when one or more of those departments gets strapped for manpower, has its budget cut or gets a new manager who really doesn't like DP or DP people — or if the department already has a manager who hates DP or has no understanding of how the DP department works or how much work the project will take?

Then what? A lot of times a manager will go along with a multidepartmental project only because those above him want it, order it or request it nicely enough. Often it is just a matter of departmental comity.

But all that cooperation sure can break down in a hurry. And then what do you do? Send some of your DP people up to the recalcitrant department to beg to see their manual records so you can update the data base? Will they even let you in?

And what about the weekly routine — you know, that inventory report you're supposed to have out by Friday but the machine is down and the programmers are arguing among themselves about the football lottery and

*(Continued on Page 32)*



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# Half of OS Shops Use Independent's Sort: IDC

WALTHAM, Mass. — Based on a study of 133 installations with 197 "IBM 360/370-type computers" running under OS or OS/VS, International Data Corp. (IDC) has determined that Syncsort from Whitlow Computer Systems, Inc. is used by 54% of the systems while sorts from IBM are used by 42% of the sample.

The researchers apparently felt confident enough of those percentages to apply them to the 3,400 OS or OS/VS systems installed in the U.S. and estimated that there were 1,836 users of Syncsort and 1,427 users of the IBM sorts as of July 1.

An additional part of the study, which was commissioned by Whitlow, analyzed the migration of users of sorting products between July 1, 1977 and July 1, 1978. According to IDC's report, "it was established that 96 out of 300 new OS and OS/VS systems became Syncsort users during the study period."

At the same time, it was also determined that 204 of the new OS or OS/VS systems entering the market during the study period were users of IBM's SM1-5740 sort package, IDC reported.

The statisticians also did some calculations to determine how many users of IBM's SM1-5734 or SM023 migrated to SM1-5740 in that year-long period. This number was derived "by subtracting the number of new computers using SM1-5740 (204) from the number of SM1-5740 users who converted to Syncsort (313) and adding the difference to the net increase of SM1-5740 users during the study period," according to IDC.

The fact that Release 3 of SM1-5740 could execute in OS/MFT, MVT and OS/VS enabled OS users to convert to SM1-5740 prior to converting their operating systems to OS/VS. This resulted in more than 50% of the combined SM1-5734 and SM023 systems converting to SM1-5740 during the study period, the researchers commented near the end of their report.

The results also showed that the majority of new Syncsort users were previous users of SM1-5740. Thus, the summary concluded, although both SM1-5740 and Syncsort acquired over 500 new users, the SM1-5740 base increased by only 232, due to 313 users switching to Syncsort IV-and-a-half after having used Release 3 of SM1-5740.

# Packages Aid Tandem Users

(Continued from Page 24)

cipated during data base design, the company indicated.

Enform reportedly produces reports in less time than conventional languages such as Cobol, and its reporting options allow sorting and summarizing of retrieved data as well as evaluation of built-in or user-defined functions.

Described as a "nonprocedural language," Enform allows users to make queries with simple requests in English statements.

Expand will be released in March 1979 with a one-time license fee of $10,000 plus a microcode charge of $1,500 per processor in the network. Enform will be available at the same time and will cost $7,000 for the license fee and $1,500 for the microcode fee for each processor.

Tandem Computers, Inc. is at 19333 Vallco Parkway, Cupertino, Calif. 95014.

The interactive database system that helps a space-minded company hold costs down to earth.

Lockheed Missiles & Space Company, Inc., was looking for a way to move a variety of data management systems onto their own computer—instead of using expensive outside services.

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Lockheed's first Model 204 project involved the transfer of a system that controls large volumes of cost-estimating statistics. Model 204 not only handled the data, but also put it within easy reach of all types of people—from computer experts to clerks.

If you need a DBMS for your IBM 370/138 or larger computer, find out why thousands of users nationwide are satisfied with Model 204. Clip your business card to this ad and send to Computer Corporation of America, 575 Technology Square, Cambridge, MA 02139. 617-491-3670.

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| TI 810 Printer 150 CPS | 1,795 | 170 |
| TI 830 Printer KSR | 2,395 | 333 |
| TI 733 ASR | 3,995 | 378 |
| TI 770/1 Int. Terminal | 4,475 | 418 |
| TI 770/3 Int. Terminal | 5,485 | 510 |
| Qume LT8 Qual KSR | 3,095 | 390 |
| Qume LT8 Qual RO | 2,695 | 355 |
| Hazeltine 1400 CRT | 835 | 78 |
| Hazeltine 1500 CRT | 1,145 | 107 |
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I would like to express my thanks to all of our customers and friends who have used our program products over the years. I can assure you that we will honor your trust by continuing to offer effective and price-worthy software products in the future. Allen Services Corporation appreciates your business.

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## Graphics Work Eased

IRVINE, Calif. — A cross-assembler written in Fortran IV is now available from Genisco Computers to lower the time and labor cost normally required to provide stand-alone, customized routines to Genisco's programmable graphics display systems.

The package should enable a much wider user base to work comfortably with the Genisco system, a spokesman said, noting that programming of the unit has until now been limited to those willing to work in the absolute machine language of the display systems' processor, which is unique.

Fortran IV is far more common and is available on almost all the host CPUs — mini or mainframe — from which the raster-scan-oriented display units get their input, he continued.

A manual describes in detail how users can work this langugae to drive the Genisco processor. The cross-assembler, in fact, can be used to create any of the 55 instructions the processor supports, he said.

The cross-assembler is provided in 9-track, 800 bit/in. magnetic tape format. Routines developed with it can be "autoloaded" from a host CPU to the programmable graphics processor.

The software and accompanying manuals are available for $1,000 from Genisco at 17805 Sky Park Drive, Irvine, Calif. 92714.

## DBMS Installation Effort Can Leave Staff Unnerved

*(Continued from Page 29)*

the systems analyst is out sick or on vacation or on his honeymoon or on a three-day bender and Kelly Girls just laughs at you?

You think you've got problems? They're just beginning.

How do you explain to the other department heads that Joe in accounting won't cooperate? "What the hell does it matter?" you're asked. "That's not my problem," each one says or — even worse — "That's *your* problem."

And you start thinking that all you can do is go up to the executive suite and ask for a little push from above. Are they going to care?

Are you kidding?

And then you start to trace it back in your mind. Who started this whole thing anyway? Oh yes, that young kid with the big ideas who was right out of business school, the kid who left six months ago when the data base he dreamed up and pushed so hard for — he was the boss' golden boy then — was only half complete, and only he knew where the records were and what was going on.

So now it's Friday afternoon, and the inventory report has just left for the right manager, and the payroll is out, and believe it or not the machine is still up and every one is relaxed and looking forward to the weekend. And all you can think of is that damn data base and how you've "got to do something about it next week, no way around it."

Pretty soon, if not updated, it's going to be worthless and, as usual, you're going to get all the blame.

So you shuffle on down to the corner bar and grill and order your usual double with a milk chaser. You sit there for a few minutes munching peanuts, trying to unwind.

You notice, lying on the stool next to yours, a copy of today's newspaper, left by a previous customer. Gee, it's been so busy today that you haven't even seen the front page.

So you pick it up, but do you turn to the sports? Hell, no! Slowly you flip to "Positions Available" ads.

## ASI Outlines Future Plans

*(Continued from Page 28)*

computer-assisted instruction.

- First to offer cost-free education support personnel to clients.
- First to jointly develop video training with various manufacturers including Cincom Systems, Inc., ICL, Inc. and Informatics, Inc.

The projected growth of both ASI and Deltak reveal a very healthy industry. Their projections are supported by data from the annual survey of Brandon Systems Institute, Inc. (BSI). Gary Slaughter, president of BSI, said DP training budgets are increasing by more than the cost of living in more than half of the organizations surveyed.

*Couger is a professor of computer and management science at the University of Colorado.*

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20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
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50 Wholesale/Retail Trade
60 Finance/Insurance/Real Estate
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75 Business Service (except DP)
80 Education/Medicine/Law
85 Government - Federal/State/Local
90 Printing/Publishing/Other Communication Service
95 Other ____________

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11 President/Owner/Partner/General Manager
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22 Director/Manager/Supervisor DP
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## And Reduce Newspaper's Costs

# Terminals Give Reporters Flexibility

**By Ronald A. Frank**
CW Staff

DES MOINES, Iowa — Portable terminals have replaced typewriters at the *Des Moines Register and Tribune* as a more efficient way to file stories.

By using intelligent portable terminals and an in-house computer, the paper has reduced the costs and increased the efficiency of its newsgathering operations, managing editor Dick Kline said.

The paper originally purchased its Texas Instruments, Inc. Model 765 terminals for the Washington bureau. The writers might get back from an assignment late in the evening and the story might not be written until 2 a.m. "They used to have to worry about getting somebody to dictate the story. They would have to wait until the next morning. Now they can enter the story right from the terminal using any telephone," Kline said.

The Washington bureau had an Associated Press private line back to Des Moines which cost $165/week plus terminal equipment. This line was dropped and the paper put six 765s into the bureau instead. Now the phone bill runs about $97/mo from Washington to Des Moines, which is a big savings. The average cost of filing a story with the portable terminals is about $1.30, Kline said.

Because of the critical nature of the job, Kline said it is important to keep spare terminals available in case there are malfunctions. But generally speaking the terminals have not had unusual reliability problems and the TI service on them is good, he said.

Although originally the terminals were purchased for the Washington bureau, they have caught on fast with others on the editorial staff. Sports writers covering football games at distant cities can file their stories as soon as the games are over, he said.

### Contention Problems

There have been some contention problems from stories being transmitted to the Univac 9400 CPU at the paper, but the problem results from having only one phone line into the mainframe. Kline is now looking at ways to get more incoming capacity.

Reporters enjoy using the 765s, since they are able to generate a hard copy for reference. Then, after editing the material, they can reansmit it via a standard telephone handset to the Univac 9400 CPU at the press

(Continued on Page 34)

# Table-Top Terminal Printer Among Decwriter Additions

MAYNARD, Mass. — The Decwriter family of Digital Equipment Corp. terminal printers has gained a 180 char./sec model and the vendor's first table-top model, available in two entry-level versions.

The Decwriter line is now topped by Decwriter III, designed to upgrade digital networks in the 300- to 1,200 bit/sec range by increasing productivity and operating speed as well as reducing line charges. Decwriter III (also designated Model LA120) suits "applications requiring a high rate of data transfer, a high degree of interaction between computer system and user, or both," a DEC spokesman said.

Intended for time-sharing or stand-alone environments, Decwriter III offers microprocessor-controlled selection of more than 45 features via keyboard prompting or under program control, DEC stated.

The bidirectional printer has a 1K-char. buffer and logic that moves the print head to the nearest margin after completing a line and allows "quick skipping" over areas for which printing is not required, DEC continued.

Featuring an RS-232 interface, the pedestal-mounted Decwriter III handles rate selections in the 50- to 9,600 bit/sec range, but is called "primarily" intended for 1,200 bit/sec applications. Tractor paper feed, 7 by 7 dot matrix character representation, eight font sizes, six line spacing selections, self-diagnostics, a numeric keypad and both horizontal and vertical tabular settings are also provided.

In the compressed-font style, the Decwriter III can print across the entire width of a 14-7/8-in. computer form, yielding a 216-column output, DEC added, noting the unit draws 87- to 128 Vac. Options include a 4K-char. buffer capacity.

### For Serial, Asynchronous Uses

Decwriter IV "can be used in virtually any application requiring a serial asynchronous Ascii terminal," the vendor declared. Available in LA34 and LA38 versions, the entry-level terminal printer employs a 9 by 7 dot matrix, both in upper and lower case, and al-

(Continued on Page 34)

# Steamship Firm Looks to DDP For Tracking Shipment Status

Special to CW

LONG BEACH, Calif. — Sea-Land Service, Inc., a large containerized steamship company, relies on a terminal-based distributed DP (DDP) system to monitor the status of shipments bound for the firm's Long Beach docks.

This responsibility involves receipt of all charges due, original bills of lading, customs entry, customs clearance and other documentation that must be completed prior to release of cargo for final delivery, according to Judith Hultine, supervisor of Sea-Land's customer service department.

The firm uses a Sycor, Inc. Model 440 with four CRT terminals in the customer service department and one terminal and printer in the documentation department.

Each bill of lading contains a nine-digit identifier number; the first three digits represent the port of origin and the last six digits are a sequence number.

As the bills of lading are received, shipment information including bill of lading number, vessel, consignee, container number; weight, cube, bill rating and charges due, is entered via one of the four terminals and automatically stored for future use.

"Time is money," Sea-Land manager Vic Biringer explained. "Most of our tariffs allow a seven-day free time period for our customers to have their merchandise removed from our docks. Beyond the seven days, a demurrage or storage fee is imposed.

"In addition, a myriad of other time commitments on delivery translate into dollars for our customers," Biringer said. The total time cargo spends in transit costs money — in interest as well as in capital investment. Poor or inefficient mangement of shipping documentation could slow cargo flow.

Customers are thus constantly telephoning the customer service department for shipment status information. "We've conducted several telephone surveys," Hultine noted, "and have found that we receive 1,000 to 1,200 incoming telephone inquiries every week. This volume used to produce a major bottleneck in customer service."

### Immediate Response

"However, with our system, we can immediately respond to customer calls," she continued. "By simply typing the bill of lading number into the keyboard of any of our terminals, we can retrieve a complete record of every aspect of the shipment and display it on the terminal screen in any one of three different formats.

"We can then respond to the customer in-

(Continued on Page 34)

# *DEC Adds Net Software For Decsystem-20 Family*

MAYNARD, Mass. — Digital Equipment Corp. has expanded its network software to the Decsystem-20 family of systems. Decnet-20 is the latest release of Decnet Phase II products that enable users to interconnect all major DEC computers and operating systems.

Decnet-20 is based on Digital Network Architecture (DNA) protocols and runs under the Tops-20 operating system. It permits task-to-task (program-to-program) communications between a Decsystem-20 computer and any adjacent network node — another Decsystem-20, a VAX-11/780 system or PDP-11. Decnet messages sent and received by the user programs can be in any data format, DEC said.

Decnet-20 operates with Digital Data Communications Message Protocol (DDCMP), Network Services Protocol (NSP) and Data Access Protocol, which are modules within DNA.

Decnet-20 includes a Network Control Program that logs and displays statistics such as data on network message traffic and errors. It also controls local loopback test arrangements to aid in isolating communications problems, the vendor said.

On Decsystem-2020 systems, Decnet-20 is implemented as an ancillary process under Tops-20 and resides in the 2020 processor. Decnet-20 implementation on Decsystem-2040, 2050, and 2060 systems uses a separate communications front end, the DN20.

Decnet-20 software is available for a single-system license fee of $5,000, including installation and support.

The DN20 is a PDP-11/34 which costs $28,200 for use as the Decnet-20 front end.

# Direct-Connect Modem Offered

SAN JOSE, Calif. — A full-duplex originate/answer modem for use in direct-connect mode rather than data access arrangement has been added to Anderson Jacobson, Inc.'s (AJ) family of 1,200 bit/sec data sets.

The Model 1255 modem is compatible with Vadic Corp. VA34XX modems and AJ's most recently announced acoustic coupler, the AJ 1234.

The product suits interactive timesharing, message network and distributed data processing applications. "With the elimination of line turns, characteristic of half-duplex operation, the AJ 1255 increases throughput fourfold, reduces connect time and maintains viable data integrity," the vendor stated.

### Boosts Mobility

Registered with the Federal Communications Commission to work with the AJ11 permissive jack or the vendor's RJ41 or RJ45 data jacks, the unit enhances communications mobility and reliability, the vendor claimed.

A telephone is optionally available with the modem.

Without the telephone, the AJ 1255 costs $825; AJ said from 521 Charcot Ave., San Jose, Calif. 95131.

# Decwriter Line Expands

*(Continued from Page 33)*

lows the user to select any of four character sizes.

Both Decwriter IV versions also offer a 210 char./line output capability via a compressed font style. The model's output rate of 30 char./sec is maintained through use of a buffer that stores characters being received by the terminal while it is executing a carriage return, DEC said, adding that a special burst mode causes the print head to accelerate its print rate until it has caught up with the transmission.

A special-purpose microprocessor permits the user to select type font, tabs and margins by using a "set-up" key, the vendor continued, adding that settings can also be made from the CPU connected to the terminal, through programmed commands.

The LA34 features platen paper feed but does not provide a numeric keypad, while the LA38 features both platen and tractor paper feed and does include a numeric keypad.

Both versions of the table-top Decwriter IV accommodate 110- and 300 bit/sec rates; provide a 128-char. buffer capacity, self-diagnostics and horizontal — but not vertical — tabular settings; weigh 25 lb and draw 87- to 128 Vac.

The Decwriter III costs $1,830 in quantities of 100 and first deliveries are scheduled for January DEC said.

The Decwriter IV LA34 costs $1,450 in minimum quantities of 50 or $975 in 100-unit orders and will be shipped starting in February, the vendor noted, while the LA38 costs $1,700 with first deliveries planned for late spring.

If you don't need dial-up and you're looking for an inexpensive local or in-house communication link that's RS-232 compatible, then consider a pair of our M-1 asynchronous short haul modems. Purdue University, Princeton University, NASA, the U.S. Navy and many others have found that our M-1's are a cost effective way to solve communication problems up to 10 miles or 9600 bps.

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# Steamship Firm Uses DDP For Control of Shipments

*(Continued from Page 33)*

quiry with an accurate and up-to-date status report. Callers may then be immediately informed whether we have all the necessary paperwork required for movement of the shipment and whether it is available for pickup," she said.

Prior to obtaining the 440 system, Sea-Land used a manual procedure, where all shipping information was logged by hand, from paperwork received to numerical log. "Only one person at a time could access this log because it was a single hardcopy document," Biringer recalled. "Large amounts of time were wasted by the employees responding to inquiries. Several people would be waiting for the log while another was either answering telephone inquiries, logging or trying to assist a trucker. It was quite inefficient," he said.

### Clustered Distributed DP

Using the clustered distributed DP concept, the company can use all terminals as instantaneous and simultaneous data retrieval stations. Each person performs more efficiently and can spend more time on other aspects of customer service. Four different terminals in the customer service department provide information at the same time, with no delay to anyone.

"We find it's a lot easier to sit at a computer terminal, key in a number and have everything you need appear on the screen, than it is to be flipping through a log book searching for a particular number," Hultine observed. "And the system is easy to use. All that is required is the ability to depress typewriter keys or use a 10-key adding machine."

A fifth terminal is located in Sea-Land's documentation department, where it is used to input immediate transportation entry (IT) data and to produce IT reports. The IT is a manifest of the goods under U.S. Customs Service control and is used to transport cargo, in bond, from port of entry to an interior point where the cargo may be cleared through Customs by the ultimate receiver.

Input data describes carrier, consignee, consignee's address, foreign port, bill of lading number, date of sailing of vessel, name of vessel, arrival data at Long Beach, latest location of goods, carton markings, shipper, number of pieces, number of cartons, type of contents, weight, value and container number.

All of this information may be instantaneously retrieved and printed in the appropriate IT format at the touch of a button. The system also produces a manifest, listing some of the preceding information for all cargo that is interchanged with rail for movement to final inland destination.

All incoming shipment logs are printed by Sycor's 300 line/min Dataprinter in any of the desired Sea-Land customized formats. Included is a summary log or way bill report that is produced after all the transactions against a given vessel are complete.

The way bill report lists for each vessel a bill of lading number, vessel name, customer name, broker, broker's file number, total pieces in shipment, total weight, total cube and revenue tons, all in metric.

The report also describes how a bill is rated; i.e., on a container load basis or on a less-than-container load quantity. It also contains information on total revenue due against shipment, date of revenue payment, date of receipt of original bill of lading, Customs clearance, date of pickup and trucker.

Other reports made are a periodic log describing all cargo on hand and a delivery log reflecting all cargo that has been delivered.

# Paper's Smart Terminals Give Savings, Flexibility

*(Continued from Page 33)*

site at 30 char./sec. And if message transmission is garbled because of interference over the phone, they can transmit, since the terminal will not purge its memory except on command.

To date, *Des Moines Register and Tribune* reporters have transmitted stories from hundreds of miles away from their news plant. They have covered tournaments at remote golf courses, as well as from a local police station. Still others have taken the terminals home at night to compose, edit and transmit their stories to the news plant via their home phone.

In essence, the paper has established a "mini wire service" which empties into the 9400 CPU. Reporters can hold two stories in the 765 bubble memory at the same time, and each or both of them can be inserted in the earliest possible news edition. Since the stories can be stacked in memory for cost-effective, high-speed batch transmission, dollars are saved by reducing communications costs.

Kline said the major features of the 765 are portability, the ability to capture the reporter's original keystroke and reliability.

Its ability to capture the original keystroke (eliminating retyping or repunching before the newspaper is composed) is attributed to is nonvolatile bubble memory.

The memory is compact, each 92K bit being about the size of a quarter, and able to store up to 20K characters (four or five pages of typewritten news stories) in memory.

The memory replaces magnetic tapes, paper tapes and other electromechanical memories that are less reliable and too cumbersome to carry into the field. And if power is shut off, the stories are retained in memory, to be transmitted over standard phone lines at 30 char./sec when rates are lowest.

Electrical "brownouts" or "blackouts" will in no way affect stories in memory.

The Model 765 portable memory terminal offers reporters the ability to record and edit. Wherever there is a phone, edited stories can be transmitted to the CPU at the home news plant.

# Which CRT family now includes a simple, character-mode terminal with bright, high-resolution display, two full pages of continuously scrolling memory, familiar typewriter-like keyboard with embedded numeric keypad, comprehensive character and line editing, eight preprogrammed function keys, self-test and optional built-in 120 cps hard copy?

# HP introduc

We took a long, hard look at how you use a simple CRT terminal. We applied 10 years of experience producing sophisticated, high-performance computer products, so the newest member of HP's terminal family is engineered from just one point of view: yours.

If you used a CRT all day, you'd demand the brightest, sharpest display made. So we didn't take any shortcuts on the 2621's display. It's the same display with enhanced 9X15 character cell you see on every HP CRT terminal, even our top-of-the-line models.

Interactive sessions go faster if you can look back at what you've already done. So we designed two full pages (48 80-character lines) of continuously scrolling memory into the 2621.

Recognize the 2621's keyboard? It's a lot like the familiar typewriter almost everyone's used to. Which makes the 2621 easier to learn, faster to use. And to accelerate keying in numbers, we put the numeric keypad right in the middle of the keyboard.

Then we increased the capability of the 2621's simple keyboard with eight special keys. In regular use, they control the cursor, rolling and scrolling. But they're also labelled on the screen with preprogrammed functions which, with a touch of the shift key, control self-testing, terminal configuration, display functions and editing.

Editing? On a simple CRT? Sure, because editing gets more work done faster. The 2621's comprehensive editing includes character and line insert and delete, clear line and clear display. What's more, the 2621 keeps your input separate from your CPU's so you can edit data before sending it to your CPU. And all without rewriting a line of your system's software.

And the 2621 is Bell 103A compatible and communicates with your CPU at 110 to 9600 baud through an RS232C interface. Which makes interfacing a snap.

That's the 2621A.

But we've gone a step further. How many times have you wanted just to hit a key and get hard copy of your CRT display without making a big project out of it? Now you can with the 2621P. Its built-in 120 cps thermal printer zips out a page of hard copy in seconds. With a single keystroke.

And here's more good news: the 2621A costs only $1450; the 2621P with built-in hard copy costs only $2550.

Surprised by all these features in a simple, inexpensive, character-mode CRT? We don't think simple has to mean unsophisticated. To prove it, we're turning HP's advanced technology and 40 years of manufacturing experience into products you need.

Like the 2621: the simple CRT you'd expect from Hewlett-Packard.

**Try this on your favorite CRT:** With the 2621P, you just hit a key and walk away in seconds with hard copy of your CRT display. The built-in thermal printer prints upper and lower case at up to 120 cps.

The 2621's bright, high-resolution CRT displays the full 128-character ASCII character set, including upper and lower case, control codes, and character-by-character underline, in 24 80-character lines.

Eight screen-labeled preprogrammed function keys magnify the power of the 2621's keyboard. Preprogrammed functions include editing, terminal configuration, printer control and self-test.

To make numeric data entry faster and easier, we put the 2621's numeric keypad right in the middle of the keyboard, instead of at one side.

The 2621's familiar 68-key keyboard is almost as easy to use as a typewriter.

☐ I'd like to know more about HP's new 2621A and 2621P with built-in hard copy.

☐ I'd like to see HP's new 2621A and 2621P with built-in hard copy.

☐ I'd like to know more about HP's complete family of terminals.

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The Sprint 5 KSR terminal has a typewriter keyboard for communication, data entry, and programming, plus a numeric cluster for quick numeric entry. And the Sprint 5 RO functions with the same command set, received through communication lines.

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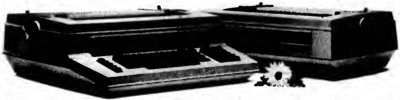

For details, contact Qume or your nearest data terminal dealer. 2323 Industrial Parkway West, Hayward, California 94545.

## With Immediate Sales Updates

# System Keeps Retail Chains' Accounts Current

VINELAND, N.J. — An on-line Automated Retail Merchandising System (Arms) that captures data as sales are recorded, transmits this data to a CPU and provides immediate updating of sales, inventory and other accounting data for retail chains has been developed here by Concept Systems, Inc. (CSI).

The CSI turnkey system interfaces with a number of point-of-sale (POS) terminals, including most NCR Corp. models. A number of these systems are in use at retail chains throughout the U.S. and Canada, and CSI has recently received an order from the U.S. Navy to install a pilot system near Chicago for Post Exchange applications.

One of CSI's "most satisfied customers" is Coriston, Inc., with four chains and 70 stores in eight states, according to Charles Thomas, CSI vice-president for technical operations.

"Each night," an unattended Vadic Corp. auto dialer polls the 70 branches, collecting data on transactions, sales, returns, payroll — whatever is needed," Thomas said.

"Data is transmitted from the branch stores to the central CPU using 1,200 bit/sec Vadic [Model 202-type] auto answer modems. During the night, data is processed unattended, reports are generated and are ready when headquarters opens at 8 a.m. the next day. If there is a problem, a particular store can be repolled and errors corrected before the store opens at 10, " he continued.

### Few Problems

With the Arms system, CSI has reported few problems. For example, during Christmas week, 120,000 transactions were polled on a single system with an error rate of 0.02% — compared with the typical error in a manual system of close to 3%, Thomas said.

"Three years ago we replaced Bell modems with Vadic units," Thomas recalled, "and have realized an 11-1/2-month payout by purchasing instead of renting. This means we have made money for the past two years simply by switching vendors. We've had virtually no downtime on the modems, plus we have far better line control because of the displays and diagnostics."

The only data communications problems have been during installation, and most of them resulted from the Bell Data Access Arrangements (DAA). From now on, CSI will use Vadic direct-connect modems and eliminate the Bell DAAs, according to Thomas.

Another thing that has impressed CSI has been Vadic's knowledge of the total network, Thomas said, adding that the vendor's people know far more than the average telephone company service man.

"Because of Vadic, data communications has been quite automatic, which is very important to us since we can't be bogged down reinventing the network each time we install a system," he said.

### Proposal Preparation

Arms can automatically prepare proposals and quotations for prospective customers. A company profile is generated from basic information such as the type of store, number of locations and reports desired.

The system will then automatically prepare a detailed proposal, including software and hardware requirements and prices. The proposal includes system specifications, flow charts and a Gantt chart so the system can be bought piece by piece, Thomas explained.

Since Arms is modular, users can implement the program in stages. The major functions of the system include purchase order management, merchandise control and reporting, merchandise movement management, merchandise ticketing, accounts receivable and payable, general ledger and payroll and customer billing.

In addition, Arms provides for data base maintenance and other utility routines to keep files current and operative. Most of Arms applications are performed on-line, and the system was designed to provide accounting and management information instantly through CRTs and/or hard-copy printouts.

Systems hardware consists of a Microdata Corp. Reality CPU with up to 128 64K words of memory. Peripherals include tape drives, disk drives, CRT terminals (1,920-char. displays), high- and low-speed printers and optical character recognition A-type ticket printers.

Data communications equipment in-

(Continued on Page 40)

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## *Touch-Screen Digitizer Bows*

BOHEMIA, N.Y. — Megadata Corp. has introduced a Touch Screen Digitizer that allows users to touch a display screen to access data.

When added to display systems, the device lets an untrained person gain direct access to a computer and its data bank, the company said.

The Touch Screen Digitizer is said to eliminate fixed-function keyboards and lightpens, permitting the operator to devote attention exclusively to the display.

The touch screen operation is accomplished by means of a Megadata process termed Echo Surface Wave Ratio (ESWR), which operates on the same principle as radar or sonar. The ESWR process uses two rows of piezoelectric transducers, one on the vertical edge of the display and one on the horizontal edge.

By pulsing these transducers with a signal, a wavefront in the X and Y directions is propagated across the surface of the faceplate. When a finger is pressed on the faceplate, a reflected wave is created by the disturbance of the wavefront.The reflected wave is propagated back to the transducers and detected at that point, the firm explained.

The Megadata Touch Screen Digitizer is available for 15 in. screens, with a 25° radius. The digitizer and its associated electronics cost $1,200 to $1,500 from Megadata Corp., 35 Orville Drive, Bohemia, N.Y. 11716.

## CCMI Extends Services Of National Tariff Library

RAMSEY, N.J. — The Center for Communications Management, Inc. (CCMI) has introduced a "selective screening service" for its National Tariff Library.

Users interested in specific functional areas may subscribe on a selective basis, CCMI stated, noting however that "the generalist" may still obtain a full set of the tariffed rate and policy schedules on file with the regulatory agency.

The five functional areas are:

- Telephone switching systems (for example, PABX, Centrex).
- Key systems (for example, Comkey, Horizon).
- Data communications equipment and systems (for example, modems, multiplexers).
- Private-line services (for example, data, voice, Telpak).
- Local exchange detail (for example, message unit schedules, extended area plans).

Tariff excerpts covering these areas are available for the major Bell operating company in each of the 48 conterminous states and the District of Columbia at $50 per category/state, CCMI said, adding that updating is furnished on a weekly basis at 40 cents per page.

Inquiries should be sent to Tariff Coordinator c/o CCMI, P.O. Box 324, Ramsey, N.J. 07446.

## System Keeps Data Current

*(Continued from Page 39)*

cludes Vadic 1230D modems and 801C/D auto dialers. A typical Arms system for a retailer costs $150,000 or $4,000/mo under a five-year lease/-purchase agreement, including maintenance. A system for a chain of 55 stores might sell for $250,000 or $6,500/mo on a five-year lease/-purchase plan.

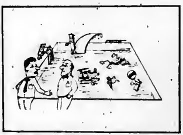
### Further Benefits

The system allows graphic display of open-to-buy information on CRT terminals in the store, showing the status of open orders, cancellations and adjustments.

Another Arms benefit is that incoming goods can be automatically ticketed and extensive product information translated into codes for POS register use.

In addition, Arms handles all accounting functions — such as accounts receivable, general ledger, posting and financial statements.

Finally, the data communications network with Vadic modems and auto dialers allows individual retail stores to employ the central office CPU.



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## *Wordstream Gains Bell-Type Interface*

NEW YORK — Wordstream Corp. has unwrapped a communications interface that allows two or more Wordstream word processing systems to transmit or receive information over conventional telephone lines.

Using a Bell System data set, the interface allows information to be transmitted or received without interrupting text entry, editing or printing operations, the vendor said.

To send data, the operator selects the communications mode from the system's program directory and enters a few commands, Wordstream explained. An automatic monitoring system reportedly signals the operator with an error message upon detection of a transmission error.

The interface may be purchased as a Wordstream option for $1,600 or leased for $37/mo on a 36-month basis, the Management Assistance, Inc. subsidiary said from 300 E. 44th St., New York, N.Y. 10017.

# Decision Data Adds Serial Printer Designed for Users of IBM 3270

HORSHAM, Pa. — A serial printer aimed at IBM 3270 users has been announced by Decision Data Computer Corp.

The Decision Data 6540/02 printer is compatible with the IBM 3271, 3272 and 3274 control units as direct replacements for IBM 3284, 3286 and 3287 serial printers; and multiple 6540/02 configurations can replace IBM 3288 and 3289 line printers with improved overall cost/performance, the vendor claimed.

The 6540/02 prints bidirectionally at 120 char./sec over a 132-position print line. Each character of the printer's 96-char. set is formed by a 9-by-7 dot matrix, Decision Data continued.

Featuring a Decision Data Model 4000 character buffer, the 6540/02 printer with all interface attachments and maintenance costs $3,975; delivery is promised within 90 to 120 days of order.

The printer can also be rented for $130/mo to $175/mo, depending on contract terms, the vendor said from 100 Witmer Road, Horsham, Pa. 19044.

# HP 250 Gets Terminal Option

PALO ALTO, Calif. — An asynchronous data communications capability is now available as an option for the Hewlett-Packard Co. Model 250 business computer.

Asynchronous data communications enhances the HP 250's capacity for applications development by offering five channels of full-duplex RS-232 or 20 mA current loop I/O from 110- to 9,600 bit/sec. This option also enables the user to attach peripherals with RS-232 interfaces, such as remote printers and terminals, and provides for asynchronous communications to HP 3000 computers by emulating an HP terminal, the firm said.

### Converts Stand-Alones

The option converts what was previously a stand-alone computer system into an asynchronous terminal for a distributed system, a spokesman said.

The option, which includes interface card and system software drivers, costs $2,100. It will be sold primarily through commercial OEMs or directly to customers with in-house computer expertise.

The HP 250, a flexible disk-based business system that features data base management and software tools for report generation, forms handling and unprogrammed data access, was introduced in June and costs $24,000.

# Miniterm Can Now Print And Transmit Data Faster

BURLINGTON, Mass. — Computer Devices, Inc. has enhanced the Miniterm Model 1201 receive-only terminal to provide faster printing speed and transmission rates.

The Miniterm 1201 can now accept burst transmission at up to 9,600 bit/sec in either a 2K or 4K buffer memory and print out at 50 char./sec, the firm said. The Miniterm 1201 features a thermal printer mechanism that previously could print only 30 char./sec.

These capabilities will now allow CRT units to "dump" a full screen of data into the buffer at 9,600 bit/sec and allow them to then continue with further editing while the previous output is printed, the firm explained.

The enhancement does not change the price of the Miniterm 1201, which is $1,385, the firm said from 25 North Ave., Burlington, Mass. 01803.

## Modem Suits Private Lines; 202T-Compatible

FORT WASHINGTON, Pa. — An asynchronous, private-line modem compatible with the Bell 202T has been announced by the Tele-Dynamics Division of Ambac Industries, Inc.

The Tele-Dynamics Model 7202T transmits and receives serial binary data at rates up to 1,400 bit/sec on unconditioned, voice-grade leased telephone lines and up to 1,800 bit/sec on leased lines with C2 conditioning, the vendor said. Operation is full-duplex on 4-wire lines.

### Features Self-Diagnostics

The Model 7202T was described as similar to the Bell modem and it is said to feature comprehensive self-diagnostics. Two front-panel switches permit fast selection of local test, analog loopback and digital loopback test modes, the vendor stated, adding that front-panel indicator lamps display control and data functions to simplify troubleshooting.

The unit costs $440 in quantities of one to three, Tele-Dynamics said from 525 Virginia Drive, Fort Washington, Pa. 19034.

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# Protect Virtual Assets, Hammer Warns

**By Howard A. Karten**
CW Staff

ATLANTA — How good is your computer security? If you improve the security of your system with an audit, "the job you save may be your own," according to Dr. Carl Hammer, director of computer sciences for Univac.

While speaking at a session on "Computer Security Audits" at the Americas Univac Users Association (AUUA) meeting here recently, Hammer suggested that assets can be divided into two classes, physical and virtual. Physical assets — those that can be seen and touched — are, in some cases, a company's least important property, Hammer suggested.

However, the virtual assets are sometimes not only underprotected, but also liable to place many businesses in great jeopardy if destroyed.

Despite his stress on auditing, "no computer crime has ever been discovered by auditing — it has all be discovered by accident," Hammer continued. One classic case, involving a programmer on a financial application who decided to always round down and add the excess to a particular account, was discovered only when the programmer began bragging to his colleagues.

Managers must take three steps to avoid computer crimes in their installations, Hammer said: First, assets must be identified; second, scenarios of the threats to the data must be drawn up; finally, the cost of reducing these threats must be analyzed.

In addition to these measures, Hammer continued, the plan must be redeveloped yearly as situations change and backup facilities must be carefully evaluated.

As he stressed the backup aspect, Hammer warned, "Unless you have a written, binding, legal contract [that spells out every detail of a facility backup arrangement], you have no backup at all."

### Prosecution Problems

Hammer noted that some cases are difficult to prosecute. He cited the case of a Rhode Island bank's management trainee who gave a branch office staff special instructions for "opening" a terminal [preparing it for the day's transactions] in the morning.

The employee had previously worked in the bank's head office, where he had set up some special programs and data on a reserved area of a disk.

Growing suspicious after several days, the branch staff discussed the instructions with the home office staff which, in turn, discovered that money was systematically being removed from dormant accounts to accounts owned by the trainee.

The money was replaced into the looted accounts immediately before any audit, Hammer explained, thus allaying the suspicion of auditors.

When confronted with the evidence of the scheme, the employee claimed, "I don't know anything about that — it must be some kind of computer error; the computer did it." Since the employee was not caught while actually engaging in this "shell game," and since the system itself was engaged in the action, the employee could not be prosecuted, Hammer said.

In the past 100 years, the nature of the manager's job has changed from managing masses of people to managing capital and has changed again from simply managing capital to managing data and information, according to Hammer.

*(Continued on Page 46)*

# Itel Unwraps High-End AS/6; Claimed Faster Than IBM 3032

**By Howard A. Karten**
CW Staff

SAN FRANCISCO — The Data Products Group of Itel Corp. has announced a new high end for its Advanced Systems (AS) line of IBM-compatible mainframes that it claims is 1.1 to 1.25 times as powerful as an IBM 3032 or 370/168-3.

The AS/6 Model 2, which was designed and is being built by Hitachi, Ltd. of Japan, is three to four times as powerful as the AS/5 Model 3, the company said.

The processor is said to incorporate improvements in the hardware and microcode to achieve an increase in performance over the company's AS/6 Model 1. Among these are Virtual Machine Assist (VMA) and MVS/SE improvements in microcode and improvements in handling IBM virtual operating systems through the segment table origin stack.

The VMA firmware feature can reduce CPU cycle utilization by 10% to 20% under normal conditions when operating under VM/370 operating systems, the firm contended. The basic cycle time for the unit is 72 nsec; the same as for the AS/6 Model 1.

A spokesman for Itel said existing AS/6-1s will be field upgradeable to AS/6-2s for $200,000. These prices are expected to be stable for some time despite the fluctuating value of the dollar relative to the yen, the spokesman continued.

The system's introduction was apparently delayed from Itel's original intended announcement date; industry observers had expected the announcement sometime within the second quarter of this year. First deliveries are scheduled for the first quarter of 1979, the firm stated.

The AS/6-2 features air cooling and the use of high-speed, medium- and large-scale integration, according to the firm. In addition, the system uses a 64K cache buffer and a 16-byte-wide architecture.

An AS/6 Model 2 with two million bytes of memory, 7032 CPU, operator console and two I/O processors with a total of six channels will sell for $2,160,000 Itel said from One Embarcadero Center, San Francisco, Calif.

# Speech Recognition on Way For Commercial Uses: Glaser

**By Brad Schultz**
CW Staff

CHICAGO — Speech recognition (SR) will be an effective means of commercial data entry for certain applications within the next several years and will occupy an important place in DP, even though it cannot match the performance abilities of optical character recognition (OCR) or keypunch input.

So said George Glasser, president of Centigram Corp., at a recent conference session here on "Front-End Systems to Speed Up and Improve Data Entry."

Although most people prefer to communicate by speaking, data can be read or typed faster than it can be spoken and understood, Glaser noted, indicating that OCR and keypunch technology will always have a place in DP operations.

However, SR will form a major portion of the semiconductor industry by 1985, he predicted, with SR products in the $1,000 range appearing "rather soon" and, following the trend of plummeting hardware costs, available in "the low hundreds of dollars" by 1982.

The former president of the American Federation of Information Processing Societies told the session that Texas Instruments, Inc., IBM, Univac and Rockwell International are among major vendors currently developing SR technology. TI is presently the leader, having already implemented SR on an LSI chip, he said.

Sensing a military or intelligence value in

*(Continued on Page 46)*

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## *Response Time Critical*

# On-Line System Speeds Firm's Material Traffic

NEW ORLEANS — In the offshore construction industry, the speed at which a company can produce needed equipment and services is important to its success. Oceanic Contractors, Inc., international arm of the $1.2 billion J. Ray McDermott & Co., faces a daily problem of covering long distances and reducing very costly downtime.

"In a materials operation this size, with such a high percentage of priority items," L.C. Kibler, Oceanic's materials manager explained, "it is essential that we maintain maximum visibility of all facets."

To get the latest information on the 14,000 yearly requisitions, which include 63,000 line items, Oceanic makes constant use of an IBM 370/168 linked to a series of CRTs and printers.

Speed of response is critical when downtime at a derrick barge in the Persian Gulf Costs about $70,000 per day and a one-way trip by a chartered Boeing 747 to haul parts to Europe, the Middle East and the Far East costs $120,000.

According to Kibler, "we can now look at the total cost concept. Essentially, we are managing dollars, not material . . . The system enables us to analyze complex relationships such as item cost vs. priority transportation vs. downtime in the field. And it enables us to tell our accounting people what upcoming cash-flow needs will be."

### Quick Feedback

Kibler said the on-line materials system used by Oceanic gives quick feedback on how well the company is supplying and servicing its overseas operation. Every requisition can be tracked and timed, he noted, from the time it is received, until the part arrives at its destination.

Overseas phone inquiries can be acted upon very quickly, and the system "enables us to monitor, analyze and improve the performance of buyers, vendors and expeditors," Kibler remarked.

To maintain efficiency, Oceanic uses the system to provide information on:

- Price/performance to measure actual purchasing price against last price paid and market price.
- Workload including statistics which measure workload "in," backlog of current workload and workload completed.
- Cost savings to rate both cost reduction and cost avoidance.
- Administration and control including statistics used to track cost-per-purchase order and the ratio between purchasing budget and volume.
- Vendor quality and delivery to measure vendor performance in a variety of categories such as price competitiveness, delinquency rate, complete delivery vs. partial delivery, cash discounts allowed and so forth.

Oceanic supports much of McDermott's comprehensive engineering, fabrication and construction services, which are primarily marine-related. McDermott is involved in a wide variety of activities, from the design and construction of offshore and onshore oil and gas production facilities to the supply of diving personnel and equipment for underwater services.

For Oceanic to meet the needs of the McDermott enterprise, the company needs to give its managers information that will improve their ability to manage the material and the millions of dollars each must handle every year.

### Requisition Process

When requisitions come in from the field, they are categorized by priority numbers from one to five, in descending order of urgency. Requisitions can be fed into any one of six 3270 CRTs.

The computer prints a weekly report called "Age of Outstanding Requisition," which lists the number of open requisitions by buyer, including their priorities and age brackets — zero to 10 days, more than 15, more than 30, more than 60 or more than 90. Orders placed with vendors are processed by the system, and purchase orders are returned to the buyers for inspection and signature.

Computer plots of purchasing trends allow Oceanic to foresee the need for additional buyers or for additional manpower to speed service.

### Number of Aids

Expediters are provided with a number of aids to communicate effectively with the field or with a vendor. A weekly Outstanding Items Report, with data on the status of all open orders, allows the expediter to concentrate on priority orders and delinquent items.

Oceanic's traffic section handles all material once it is ready to ship from the vendor.

All through the shipping process, the computer is fed information on shipping dates, notification to the field that an order is about to be filled — and who will carry the material — and when the material will arrive.

When the material reaches its destination, information is sent via Telex to update records in New Orleans.

The on-line system was implemented in three phases: purchasing, in May 1977; expediting in April 1978; and traffic in July 1978. In September 1978 the Model 168 was to be replaced by a Model 3033 which is faster and cheaper.

### Looking to Future

"Looking a little further into the future," Kibler explained, "we anticipate establishing on-line systems between our office and key vendors within the next two to four years. This would eliminate the need for prepurchase entry; bid documentation, purchase requisitions and purchase orders."

"As I see it," Kibler continued, "an on-line system contract would be negotiated with selected vendors on an annual basis. Based on each vendor's performance over a given year, we would determine whether we would place additional business with that vendor, or, simply put, find other more qualified vendors.

"In summary, we receive many advantages from the on-line system. But perhaps the chief benefit is the timely information, available at a moment's recall," he said.

"It enables us to take corrective action as is necessary and to track and analyze virtually every aspect of our operation. As a result, individual personnel, and the materials organization as a whole, can provide an optimum response to the urgent needs of the field."

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ICE 312/279-1960

# Disk Packs Suit CDC, Ampex, Calcomp Drives

BEDFORD, Mass. — The BASF Systems Division of BASF Wyandotte Corp. has introduced three disk packs for use in drives manufactured by Control Data Corp., Ampex Corp. and California Computer Products, Inc.

The 300M-byte T-300 disk pack can be used on Calcomp T-300 drives and others compatible with the Calcomp unit, the firm said.

A removable disk pack introduced by the company will be available in either a 40M- or an 80M-byte model and is said to be compatible with CDC's 9760 and 9762 systems, as well as the Ampex DM 940 and 980 drives.

The 80M-byte module, now available, sells for $400, according to a company spokesman. Price and availability of the 40M-byte model will be announced shortly, the spokesman added.

The T-300 will sell for $800.

Quantity discounts on the products are available when 10 or more are ordered, the firm noted from Crosby Drive, Bedford, Mass. 01730.

# Cartridge Tape Drive Has Capacity of 17.28M Bytes

PASADENA, Calif. — A cartridge tape drive said to provide the highest capacity of any such drive now available has been introduced by Data Electronics, Inc.

Called "The Funnel," the drive has a capacity of 17.28M bytes (unformatted) according to the company, and a data transfer rate of 192K bit/sec.

Features on the drive include an integral tape drive, dual gap, read-while-write tape head with separate erase head and long-term speed variation of 2%. The drives do not include a formatter or interface.

The Funnel sells for $1,000 with minimum electronics and $1,300 with maximum electronics (in OEM quantities) from the firm at 370 N. Halstead St., Pasadena, Calif. 91107.

# Mainframe Helps Port Control Shipping Data

HOUSTON — Computers are being put to work here to help the Port of Houston keep track of its data relating to containerized shipping.

An IBM 370/115, running a program called Container Information Control System (Conics), helps the port monitor the status of each container from the time it is unloaded from a ship until it is reloaded on an outgoing truck, or vice versa.

"Conics has helped us streamline our operation and keep costs at a minimum," according to Gregg Seaman, manager of the terminal. The system, an adaptation of a similar one used since 1969 at a terminal in England, stores information about the location, contents, condition and destination of containers in the $53 million facility. The port is believed to be the first U.S. user of the system.

In selecting the 370, the Port Authority also considered several other systems, but rejected them when it found that the English version of the system could be adapted to meet its needs with a minimum of alteration. One reason for rejecting some other approaches was the fact that data had to be entered manually — an impracticality for a facility handling 150,000 containers yearly.

### Tracking Process

The system's involvement with containerized cargo begins when cargo arrives at the terminal building. Controllers at CRTs enter data about each container as it arrives; the data is then stored as required.

Containers destined for export are recorded when an incoming truck enters the building. Using the shipper's documents, controllers enter data such as identification number, weight, destination, shipper and contents. The system records the information and prints an Equipment Interchange Receipt (EIR); in addition, based on the type of cargo — hazardous or nonhazardous, refrigerated or nonrefrigerated, weight classification and so on — the system assigns a general location in the facility to the container.

A copy of the EIR is returned to the truck driver as a receipt; the remaining EIR copies are eventually forwarded to the port's accounting department and the steamship company. Once the container has been placed in its assigned area, its position is reported to the controller, who enters that information on the CRT.

Conics is later used to assist in drawing up a stowage plan for the departing ship. Using the CRT to locate containers in accordance with the Vessel Loading Plan, the park controller radios the crane operator with instructions for loading the containers on the ship. Their shipboard location can be printed and available within minutes after the last container has been stowed. The procedure is reversed for import containers.

### Rigorous Security

During the entire time a container is handled by the Port of Houston, security precautions are rigorous. A list is maintained of all transactions, the time they occurred, who entered them and what terminal was used. In addition, the system issues a warning message if a container does not follow its predetermined course, and it reports on irregularities such as full containers that are suddenly classified as empty.

Conics makes it possible to provide daily reports to the Terminal Office and the steamship companies showing all containers in inventory, all boxes received or delivered and any corrections made the previous day. Weekly reports show boxes remaining in the park area after seven and 14 days, and lists of containers discharged, as well as stowage lists, are provided to the agents of arriving and departing ships. Each departing ship takes with it a list of all outbound containers, by port and destination.

"Conics will allow us to maintain our quality of service as the number of containers we handle increases," Seaman said, adding that the terminal gains the following advantages by using the system:

- Efficient container handling. There are no delays because of slow documentation or poor control.

*(Continued on Page 46)*

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# Speech Recognition Coming in Some Areas

*(Continued from Page 43)*

SR, the Pentagon's Advanced Research Projects Agency (Arpa) has to date spent $15 million on "assessing the field," he added.

Glaser said SR applications are also expected in applications where a user can benefit from natural language query computing that leaves the operator's hands free, such as surgery or warehouse operations.

Glaser projected that within 15 to 20 years a businessman will be able to talk to a typewriter and receive clean copy of his words as a result. Closer to the present, SR will serve as a means of identity verification.

To gain access to classified information or a classified physical area, an individual orally identifies himself to the system, which then compares his voice print with its library record of the named person, Glaser explained. A successful match of the two voice signatures allows the data to appear on a terminal or the doors to open.

This principle is analagous to the "automatic [written] signature verification system" recently invented by IBM [CW, Oct. 16]. Comparing the two forms, Glaser said the SR approach is more economical, because less than 100 bytes of information are needed to encode a voice identity, while about 900 bytes are needed for a written signature.

Most business is conducted using a vocabulary of 1,000 words — a limit that might reflect poorly on the average business intellect, Glaser remarked, suggesting that 1,000 words is the extent of fluency commercial SR products are likely to attain in the next decade.

### Voice Variability

The critical problem facing SR researchers is the variability of the human voice, Glaser said, observing that a calm and sober individual will pronounce a given word differently than he would if he were drunken, tired or in pain. Accents are another difficulty: through the next several years, English-language SR systems will probably exclude nonnative English speakers — for example, a Frenchman who learned English.

Scientific applications of SR may prove difficult since pronounced digits are easily confused — for example, "five" and "nine." The U.S. Air Force lists the digits zero through nine as among the 14 most commonly misunderstood words in voice communications, Glaser added.

Sharing the podium with Glaser was James A. Wilson, DP superintendent for State Farm Mutual Automobile Insurance Co., who noted that dropping hardware costs and climbing labor costs are lowering the demand for keypunch technology, while raising the demand for OCR.

Wilson told the session that OCR allows the source document to be the input document — an important advantage over keypunch operations. With OCR, users can fill out a form that is input to a system without intermediate handling (i.e., media conversion or transcription), he explained, adding that data entry applications requiring rekeying can be economically designed for OCR devices.

By incorporating OCR technology in place of keypunch, State Farm has improved productivity — measured in policies processed per employee — from 2,500 in 1965 to 6,000 in 1977, Wilson said.

# Mainframe Lends Control To Shipping Operations

*(Continued from Page 45)*

- Minimized administration costs. Documents generated by Conics are better organized and more informative; the system automatically produces EIRs, eliminates hand-sorting and transcribing and performs editing, cross-checking and input validations.
- Tight security. Detailed transaction listings, audit checks and reports of exception contribute to a high level of security.
- Employee safety. Physical checks of container movements are needed less frequently, reducing the risk of moving among the containers.
- Superior customer service. Operators can schedule work to their own best advantage. Information is instantly available, resulting in less congestion at the wharves, better scheduling and more precise documents — an advantage for customers as well as for the port itself.

Conics increases profitability for shippers because it allows ships to spend less time at port. Faster loading and unloading improves the profit picture for shippers. Containerization, itself a concept whose major advantage is quick turnaround time, is supported by the addition of Conics, according to Seaman. "With assistance from Conics," he added, "we can load and discharge a [large vessel] in 24 to 36 hours."

Bruce Lyle, director of DP at the port authority, said Houston handles about 25% of its general cargo in containers, but in the next 10 years, "that figure could reach 60% to 70%."

Lyle said the low volume to container traffic gave the port time to work out operational difficulties and that now, "we have the efficiency and ability to expand our service with a minimum of expense.

"Today we are in a position to offer our customers a total container control package. And in addition, we can offer reporting capabilities that, to my knowledge, no other stateside port can match," he said.

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# Protect Virtual Assets, Hammer Admonishes Users

*(Continued from Page 43)*

In an incident in California, a programmer decided to hold a tape of the company's accounts receivable for ransom, Hammer said. But the programmer was killed in an auto accident and the tape was destroyed. Two weeks after the incident, the company was bankrupt as a direct result of the programmer's action, the Univac official noted.

For individuals, too, many assets are virtual in form. The nation's largest brokerage firm "maintains several billion dollars worth of securities on a computer," he said, leaving to the audience's imagination the result of computer catastrophes in that company.

### Unique Profile

Security in any DP installation should take into account that "computer criminals" have a profile different from more traditional criminals, Hammer maintained.

First of all, these are white collar criminals, often educated and usually working on the inside. They rationalize their crimes as taking money from a wealthy company, a thing, not an individual.

Second, in most cases, they are amateurs, not members of organized crime. However, users should not be lulled into a false sense of security by this fact — "organized crime is only beginning to become aware of the possibilities."

Third, the typical computer criminal — who is "not a dummy," Hammer reiterated — "frequently has a home computer and enjoys the challenge of computer systems." Finally, he is typically a disgruntled employee.

But the key question, Hammer pointed out, is, "How disgruntled?" Almost everyone can be considered disgruntled to some extent, he concluded.

# Printhead Added By Gulton

METUCHEN, N.J. — A 20-column-wide, gangable dot matrix thermal printhead recently introduced by Gulton Industires, Inc. was designed for medium-speed alphanumeric strip and page printing applications.

The DM20100 permits nonimpact printing, thus making possible printers that have only one moving part, the paper advance mechanism. Line speeds up to 7 line/min are possible with the unit, a spokesman said.

The unit prints a 5 by 7 dot matrix character on standard heat-sensitive paper, the company stated.

Mean time between failure is a minimum of 10 million character lines at maximum rated speed and is aided by a redundant design of the print element, Gulton said.

The device costs $106.55, or $66.60 in quantities of 100 to 499, from the company at 212 Durham Ave., Metuchen, N.J. 087840.

Storage Technology's new disk system:
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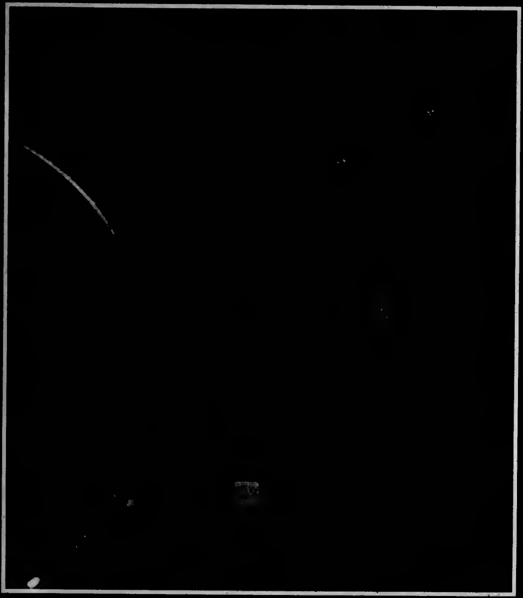
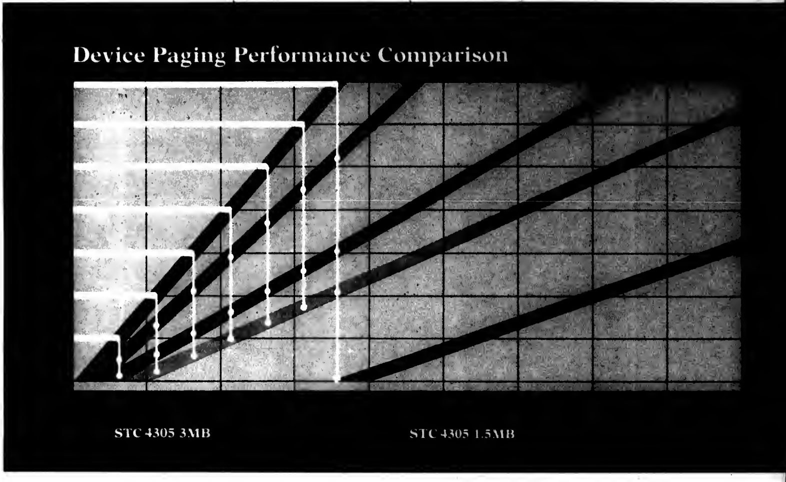


# STC introduces the Solid State Disk: It gives you faster virtual storage paging for a fraction the price of the fastest drum.



Until now, you've had three options to improve virtual machine performance, all of which were expensive: upgrade the CPU, add memory, or add drum storage.

Today, there's a better answer: The STC 4305 Solid State Disk. In a basic configuration, it gives you 134% of the virtual paging rate for 50% of the cost of IBM's 2305 Fixed Head File. Better still, Solid State Disk's capability grows faster than its price. You can add options to increase its performance more than five times that of the 2305, yet still pay 20% less.

**The best of both worlds: plug compatibility with superior performance.** Your CPU will think Solid State Disk is an IBM 2305 in every respect but performance. It runs with no software modifications under all releases of OS, VS1, VM and MVS operating systems. An STC field engineer simply plugs Solid State Disk into the block multiplexor channel of your 370 (135 or above), 303X or PCM equivalent CPU. They lead you through a straightforward conversion procedure. And you're ready to reap the performance benefits of the Solid State Disk's unique semiconductor, charge-coupled device (CCD) architecture.

For instance, with Solid State Disk, you get 0.7 millisecond access time vs. 5 milliseconds for the 2305. Storage capacities up to 45 Megabytes vs. 22.5 Mbytes. And selectable channel rates of 1.0, 1.5 and 3.0* Mbytes per second vs. a fixed 1.5 Mbyte rate.

This latter feature, when combined with dual channel option, lets you share your Solid State Disk among processors with different channel characteristics. Add the powerful dual port capability, and you can attach to more processors, or gain concurrent access for a 2.0, 3.0, or 6.0* Mbyte/second aggregate transfer rate.

---

* 3.0 Mbyte/second and 6.0 Mbyte/second (aggregate) transfer rates are options and require two byte wide interface from IBM

**Lowest cost of ownership.** When it comes to cost, Solid State Disk is a real penny-pincher. It costs less to buy, because it's easier to build. There are no critical mechanical parts to precision machine and assemble, just straightforward IC and PC board fabrication. In your data processing center, a typical Solid State Disk Configuration saves you 65% of the space required by the 2305, cuts power consumption by 60%, and reduces heat dissipation by a healthy 66%.

Extensive FE controls, coupled with a built-in microprocessor, enable STC field engineers to service your Solid State Disk in-line, off-line, or on-line. And because all components are modular and field replaceable to the module, board or chip level, you get the fastest time-to-repair at the lowest possible cost.

## Solid State Disk: Just one of the ways STC helps you get more for less.

The Solid State Disk is just one of many STC products and services designed to help you get more productivity, and more useful life out of your IBM computer. And do it with significant cost savings in both purchase price and operating expenses.

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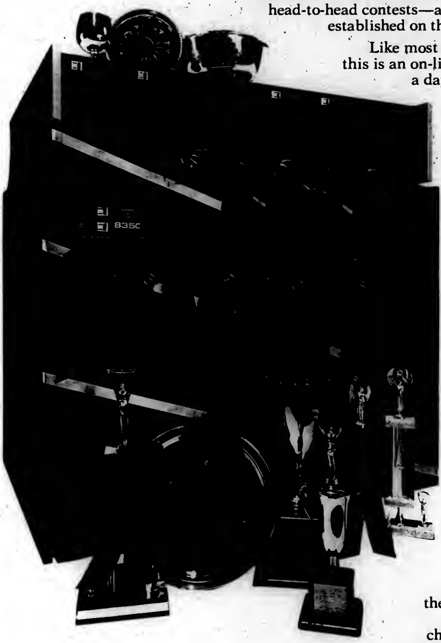
For instance, only STC drives incorporate SPAR, a unique, built-in diagnostics system that took 16 man-years to develop, and that allows our field engineers to perform all diagnostics and maintenance off-line, on-line, or in-line. Which is just one reason why national reliability studies show STC drives outperform IBM equivalents. So when you choose Storage Technology, you get more than performance. You get availability, serviceability, and reliability.

**Now, to our customer (and you know who you are) who is still using STC tape drive 001: Come on. Give us a break.** How long will a STC tape drive last? After 9 years, we still don't know. You see, the first engineering prototype we built back in 1969 is still being used by a California-based electronics firm. It hasn't had a service call in over two years. And our first production model, serial number 001, was field-converted from a 2450 to a 3470 (IBM 3420-7 equivalent) two years ago, and is also still being used heavily by one of America's largest retailers. So we're beginning to wonder if they'll ever buy a replacement. In the meantime, we'll keep giving them the same great service that's made our field engineers a legend in their own time.

**Help, police!** Creativity can sometimes make the difference between good service and great service. For example, can you imagine yourself asking the police to pick you up? That's what a couple of our field engineers did during Boston's driving moratorium last winter. An STC customer had a significant problem, and since the only legal way to drive was with a police escort, our people had to call for police assistance to reach the site.

Now, we obviously don't relish the image problems that might result from our FEs riding around in squad cars. So we're thankful that this was a rare event during the 3-day, 12-state storm. But it does underline why STC field engineers are popular enough with our customers to top the June **Datapro** report with a 3.6 rating.

**Why the 8350 has never lost a contest.** Fixed media disk users are a very picky lot. Many of them demand vigorous benchmarks before buying a winchester drive. The STC 8350 is used to winning these head-to-head contests—a pattern of success established on the very first installation.



Like most fixed media disk applications this is an on-line system running 24 hours a day, seven days a week. Anticipating typical new product problems, we arranged for this customer to provide computer time for engineering work. As it turned out, we didn't need even a fraction of a CPU second. During the 90 day test period, there wasn't a single hardware failure.

That performance was designed into the 8350 from the outset with such features as fully redundant electronics and power supplies. Elimination of discrete components in favor of easily serviced PC boards. And MIDAR, STC's proprietary diagnostic package designed to quickly direct the field engineer to a problem component for fast repair.

How would the 8350 measure up in your environment? Why not put us to the test? As the leading independent supplier of high-performance fixed media disk drives, we can provide you with the product, the experience and the service resources to satisfy your most challenging requirements. We'll even guarantee it. In writing.

**Tips and tools to tune up your storage subsystem performance.** How many channel tries before you get a start I/O? Are catalog requests idling in the queue? What's the distribution of your data sets by size? By frequency of access?

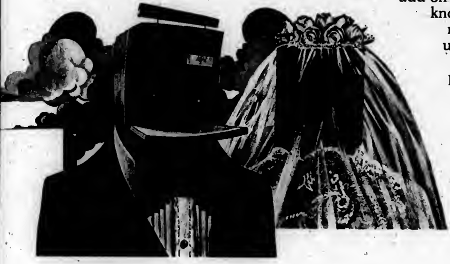
STC Systems Engineers can help with answers to questions like these to squeeze more mileage out of your existing storage equipment, and help you plan for more efficient system growth. They've helped our customers solve a wide range of storage problems under virtually every conceivable combination of CPU, operating system, and job mix. Their experience is now at your disposal in the form of free software packages.

Some of the tools you can put to work today include Configuration Planning Software with programs for evaluating tape and disk data set characteristics. High Speed Dump/Restore. And Performance Maximization, among others.

Our philosophy in providing these tools is simple. If we help you get more from what you have today, you'll probably want to do business with us when you're ready to grow tomorrow.

**Before you wed your CPU to an add-on memory, check out their hand holding.** You know that when it comes to add-on memory, installation and service are as important as hardware.

So you should know that our STC field engineers have over 250 Mbytes of large system memory experience (including more 168 add-on than any independent). So they know how to get you up and running fast. STC's new family of 158, 168 and 303X add-on memory uses the latest MOS technologies. They have fewer components for fewer failures, reduced power consumption and less heat dissipation. Their modular design makes for an easy growth path, too. All our people have to do to give you additional capability is plug in additional cards. This typically takes less than a shift, including the diagnostics. And if that's not enough to convince you, price and availability should be. Because STC add-on memory costs 30% to 50% less than IBM's. And it's available today.



**For more details** on STC data storage products and services, call your local STC sales office. Or clip and mail the coupon below to: Storage Technology Corporation, Mail Drop 3M, 2270 South 88th Street, Louisville, Colorado 80027. Phone (303) 497-6262.

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## *Before Technology Reaches Limit*

# Lecht Predicts 10-Fold Price/Performance Gain

**By Howard A. Karten**
CW Staff

ATLANTA — The next eight years will see a 10-fold improvement in the price/performance ratio for large-scale computers, but then technology used in large processors will reach its improvement limit, thus halting — at least temporarily — the improvement in cycle time and other measures of speed, according to Charles P. Lecht, author and president of Advanced Computer Techniques Corp.

Furthermore, by the mid-1980s, natural language programming will have become a reality, replacing the "junk" now used to communicate with computers, according to Lecht. This will result in a reduction in programming, as we now understand it, and a corresponding increase in computer productivity.

In a keynote speech before the annual fall Americas Univac Users Association (AUUA) meeting here recently, Lecht noted that despite impressive price/performance data in the computer industry, "this kind of savings in price/performance has always meant higher costs for us, of course, because we have to keep buying more and more."

The keynoter said that in the 1980s, users will have some big decisions to make about investing capital in automation. These will include how much hardware should be in places other than offices — in homes, for example; how much hardware should be provided by a large computer utility and how much by the user; what plug-compatible components should be bought and other tough questions.

The net result, Lecht predicted, would be that "the whole aspect of guiding investment in DP will be a tough job, to be held by graduates of our most erudite institutions."

Aiding these decision-makers will be operations research specialists, who will emerge again as they did following World War II and again, he added, there will be a shortage of them.

Lecht advised the audience, "tell your children to study library science and linguistics if they want to be effective in the computer industry of the future." He also forecast a "mix and match" method of building systems in years to come with users deciding what services to buy and then simply combining them. "The user who is most technically inclined will be the best off in the 1980s," he predicted.

Lecht also said that despite others' predictions he did not see a bright future for the minicomputer business, a prediction other people find "extraordinary."

"I think the future is not in intelligent devices, but in dumb devices. In my view, a dumb terminal is what I want, something which adjusts to me. I want to . . : let it figure out what I want."

In equipment generally, the trend will be toward the elimination of moving parts, Lecht remarked, and added, it was his belief that bubble memories would eventually replace fixed-head disks and drums.

Echoing Charles Sporck, of National Semiconductor Corp., Lecht stated, "Chip manufacturers are the computer manufacturers of the future," but, he added, too much large-scale integration has its drawbacks.

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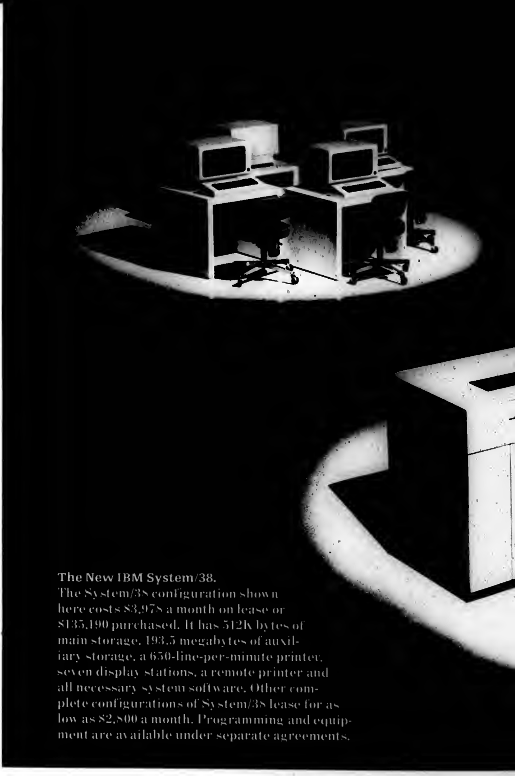
**Turn the page ▶**



The New IBM System/38.
The System/38 configuration shown here costs $3,978 a month on lease or $135,190 purchased. It has 512K bytes of main storage, 193.5 megabytes of auxiliary storage, a 650-line-per-minute printer, seven display stations, a remote printer and all necessary system software. Other complete configurations of System/38 lease for as low as $2,800 a month. Programming and equipment are available under separate agreements.

IBM thought on a very big scale.

And System/38 can have a large impact in stepping up the efficiency and profitability of the organizations which use it.

### Big computer functions in a small system

System/38 is designed to let any organization enjoy the productivity advantages of online applications typical of large-scale computers.

Specifically, IBM sought to incorporate in a simple-to-operate smaller system advanced functions that make work station applications easy to design, install and maintain.

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Let's review them briefly.

### Distributed online work stations

One of the biggest advantages of System/38 is that users don't have to come to the computer to get the vital information needed in their jobs. Instead, the computer comes to them where they work, by means of online display stations and printers called work stations.

As many as 40 local work stations – as well as additional remote work stations – can communicate with System/38 interactively. They can bring the power of the computer to people doing totally different jobs. At executive desks, in departments, plants and warehouses.

Across the hall or across the country. And the same up-to-date information will be available concurrently to all authorized users for real-time inquiry, change or update.

The value of System/38 in keeping everyone up to date can scarcely be overestimated. It can mean hundreds of thousands of dollars saved in operating efficiencies.

### A self-managed system

There are two aspects to computing: processing the data itself and managing the system that processes the data. System management can consume a great deal of expensive time and talent.

System/38, however, has a remarkable internal facility that eliminates much of the complexity of system management. Called the Control Program Facility, it monitors and manages system activity – including the flow and processing of data. As a result, users and programmers are free to concentrate on their own jobs, rather than worrying about how the computer performs its tasks.

### Central online data base

Instead of having separate data files for each application – one for or-

Photo is of design models and display screens are simulated computer displays.

der entry, for example, and another for inventory – System/38 lets you combine data for related applications into a single online data base. The integral Data Base Data Management facility presents data in whatever format and sequence is required by the user.

Every user can be in touch with the same central source of information. When data is updated for one application – say order entry – it's available for all others using that information, such as production, shipping, accounts receivable and inventory. Duplicated and conflicting data can be eliminated. Information is easier to retrieve, revise and use.

### Streamlined programming

Both new and experienced programmers will find their work simplified and speeded with System/38. Thanks to advanced technology, many functions that ordinarily require programming have been absorbed by the system.

For example, System/38 offers a powerful "query" function which can break out data in the data base as required by the user and present it in the desired sequence and report format – without conventional programming. Executives can use a work station at their desks to obtain special management reports in minutes, rather than days or weeks.

version of the familiar RPG language, programmers are given new freedom to tailor processing of data and flow of logic to the needs of an application. Moreover, new application programs can be compiled, tested and "debugged" from any work station – in real time and using real data samples – while regular processing continues without being

**More on System/38, turn the page ▶**

affected. This means that a programmer is no longer burdened with manual coding, card punching and waiting for test time and results.

In short, System/38 can mean greater programmer productivity. Streamlined programming like this benefits both the programmer and the user who want results fast.

### Single level storage

Another feature that makes for operating efficiency is an extension and simplification of the virtual storage used in larger computers. In System/38, IBM has taken this technique a big step further with the concept known as Single Level Storage Management.

It treats *all* storage – both main and auxiliary – as a single unit or level and automatically keeps track of everything stored in it. Users, particularly programmers, no longer need be concerned about program size or location or any other aspect of storage management.

### Online training

As more employees become involved with the computer, training them in its operation becomes an important task. With System/38, your people can get "hands on" experience at live work stations, using actual data files – without fear of record destruction and without interfering with the use of the system by others.

And the prompting and guiding messages flashed on the screen can aid both trainees and regular users alike. There is even a "HELP" key for use whenever further assistance is needed.

### Data integrity and security

System/38 provides an extensive range of security levels. They vary from simple basic precautions to an advanced plan which assigns a personal identification code to every user.

Under this plan, the information any individual can access, change or process is carefully designated and restricted according to a user "profile" stored in the data base. In a multiple work station environment, with large numbers of users, this kind of positive individual control can be particularly helpful in assuring the integrity and security of computer data.

### Conversion from System/3

Conversion to System/38 from an IBM System/3 can be aided with conversion utility programs. They allow the user to do as much as possible of the conversion process on his System/3 prior to installation of System/38. These programs are designed to make conversion easier, faster and less expensive and protect the user's investment in software.

### Growth with IBM support

Once installed, System/38 is designed to grow with your business. New capacity and components – such as added work stations or additional storage – can be attached quickly and easily, without recompiling existing programming to accommodate the new configuration. And most maintenance can be performed while the system continues to operate.

Moreover, wherever you're located – in midtown Manhattan or mid-Nevada – you know that IBM support is responsive. The IBM commitment to customer service goes far beyond simply supplying hardware. IBM *stays* with you.

With totally new architecture and dramatic advanced functions, System/38 can be an investment that will pay dividends for many years to come. To get the full story on System/38 and what it can do for you, call your nearby IBM General Systems Division office. Or write P.O. Box 2068, Atlanta, GA 30301.

### Behind System/38: a technological breakthrough

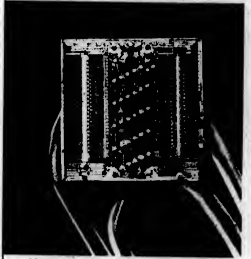
At the heart of the major price/performance improvements of IBM System/38 are two pace-setting technological advances.

The system's memory uses a new silicon chip technology with up to 64,000 "bits" or elements of information per chip. A speck of silicon less than one-tenth of a square inch in size, the 64K chip is the most densely packed chip yet employed as a standard computer component.

And in the processing section itself, System/38 uses a logic chip with up to 704 circuits – more than 25 times the capacity of the processor logic chips employed in IBM System/3.

But that's only part of the story. A totally new architecture, incorporating advanced features new in themselves, was developed for System/38. Through it, it became possible to shift some of the customary software of the computer operating system to internal handling by System/38 itself. In turn, the operating system took on functions that ordinarily call for programmers to write special instructions.

System/38 thereby relieves programmers of much tiresome and repetitive work. And the convenience of compiling, testing and "debugging" programs at work stations – interactively and in real time – can mean greater programmer productivity and faster computing results.



*Shown about seven times actual size, a 64K chip is depicted on a paper clip.*

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# Locating Transposition Errors: A Rebuttal

### By Robert B. Higgins

## IN DEPTH

IN DEPTH
IN DEPTH

The basic concept presented in Irwin Kraus' "Locating Transposition Errors"[CW, Oct. 9] is very worthwhile, but much of the information in that In Depth article was dangerously misleading at several levels. The problems can be summarized under three headings:

- The method goes too far.
- The method doesn't go far enough.
- The Cobol code does not correctly implement the method.

"New, improved" methods like Kraus' can be treacherous if their probabilistic nature is misunderstood or forgotten. It's somewhat comparable to giving penicillin injections for every illness without checking for allergies. Some people will be helped, some will be unaffected, but a few will predictably drop dead of a massive allergic reaction.

The immediate danger of a data entry "allergic reaction" to Kraus' method needs to be counteracted immediately.

Within the first three paragraphs of his article, Kraus convinced himself that *any* divisible-by-9 discrepancy in batch totals *must* be caused by a single occurrence of adjacent-digit transposition ("The enhanced method identifies a subset...which will contain the error") and proceeds to run with his "proof by assertion." The danger here is that users of error listings flagged by his method would rapidly acquire the habit of checking *only* the flagged entries — if the method flags only one entry, users might start changing that entry without checking further.

Such habits would occasionally produce confusion when the method selects *no* entries or only correct entries. They would also sometimes cause correct entries to be erroneously altered.

| ORIGINAL DATA | INPUT DATA | FLAGGED | ACTUALLY WRONG |
|---|---|---|---|
| 35.70 | 37.50 | | ***** |
| 23.64 | 23.64 | ***** | |
| 66.15 | 61.65 | | ***** |
| 125.49 | 122.79 | -270/9=-30 | |

Figure 1

| | | | |
|---|---|---|---|
| 61.06 | 61.96 | | ***** |
| 66.55 | 66.55 | ***** | |
| 127.61 | 128.51 | 90/9=10 | |

Figure 2

| | | | |
|---|---|---|---|
| 300.35 | 30.35 | | ***** |
| 476.53 | 476.53 | ***** | |
| 776.88 | 506.88 | -27000/9 = -3000 | |

Figure 3

| | | | |
|---|---|---|---|
| 26.92 CR | 29.62 CR | | ***** |
| 162.57 | 162.57 | ***** | |
| 135.65 | 132.95 | -270/9 = -30 | |

Figure 4

In Figure 1, two adjacent-digit transpositions in the same column position masquerade to Kraus' method as one error. A hasty (ill-advised?) correction process might yield 26.34 — producing a balanced batch proof by falsifying the only correctly transcribed number in the group.

In Figure 2, a digit substitution error (a 0 became a 9) masquerades as an adjacent-digit transposition error. I suspect that this particular misreading of digits may be relatively common among substitution errors.

In Figure 3, a lost zero masquerades as an adjacent-digit transposition and, in Figure 4, a transposition in a negative entry is misinterpreted by the method.

Kraus' example very nicely supports his method, just as my counterexamples support my objections. We need to remember, however, that real-life batches usually contain 20 to 50 transactions rather than two to five.

This has two implications: the chance of multiple errors in a batch is not so small that we can afford to risk deceiving ourselves (which the method will do — see Figure 1) if multiple errors happen; and the chance is quite good that Kraus' method will be able to find some "usual suspects" to latch onto in one of these "masquerade" situations.

When the sample Cobol code regards an entire transaction file as a single batch, these two dangers approach certainty.

*(Continued on In Depth/2)*

# TRANSPOSITION ERRORS: A REBUTTAL

*(Continued from In Depth/1)*

There are several other flavors of transcription errors:

- Nonadjacent single-digit transposition.
- Multiple-digit transposition.
- Substitution (a wrong digit).
- Insertion/deletion.

Surprisingly, a little bit of study reveals that these other kinds of errors also leave "footprints" in the out-of-proof amount.

Any rearrangement of the digits of a number yields another number which differs from the original number by some multiple of 9. A single adjacent-digit transposition error produces an out-of-proof amount which, when divided by 9, yields a quotient that contains only one nonzero digit (as Kraus correctly showed, the position and value of this digit and the sign of the quotient are all informative).

A single transposition of nonadjacent digits (e.g., 4,096 to 4,690) produces an out-of-proof amount that, divided by 9, yields a quotient whose nonzero digits are alike and adjacent (e.g., 40965 to 46905 gives out-of-proof 5940; dividing by 9 yields 660). The number and position of the nonzero digits in the quotient indicates the positions of the two transposed digits in the original number, while the (signed) repeated digit in the quotient equals the difference between the transposed digits.

We can thus tentatively identify single-digit transpositions, adjacent or nonadjacent, by the following procedure:

(1) Divide the out-of-proof amount by 9.

(2) If (1) yields a zero remainder, divide the quotient repeatedly by 10 until it yields a nonzero remainder, then back off and remember the number of successful (remainder=0) divisions performed.

(3) Take the quotient of the last successful divide-by-10 and attempt to divide it by 1, 11, 111, 1111, 11111 and so on until one of these divisions yields a zero remainder and a quotient whose absolute value is less than 10. Stop trying if you produce a zero quotient.

(4) If one of the (3) divisions succeeds, then:

- The number of successful divides-by-10 in (2) shows where the right-hand transposed digit is with respect to the right-hand digit position of the entire number.
- The number of 1s in the successful (3) divisor shows the distance between the transposed digit positions.
- The signed quotient, added/-subtracted (depending on the sign of the entry) to the right-hand transposed digit, yields the left-hand transposed digit.

(5) If the (3) divisions all fail, then we face something other than just one single-digit transposition error.

(6) If the (1) division fails, we have at least one nontransposition error.

### An Example

Take a look at Figure 5, in which 3941512 is mistranscribed to 3141592. We find dividing the out-of-proof amount by 9 yields -88880 with zero remainder, so we suspect a transposition.

Dividing by 10 succeeds once, leaving -8888. Dividing by 1 fails (the quotient is much greater than 10); dividing by 11 and 111 also fails.

```
 3141592
-3941512
--------
 -799920
```

Figure 5

However, dividing by 1111 succeeds (quotient= -8, remainder=0), so we conclude that if one single-digit transposition is the only cause of the out-of-proof amount, then:

*(Continued on In Depth/7)*

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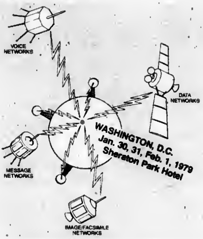

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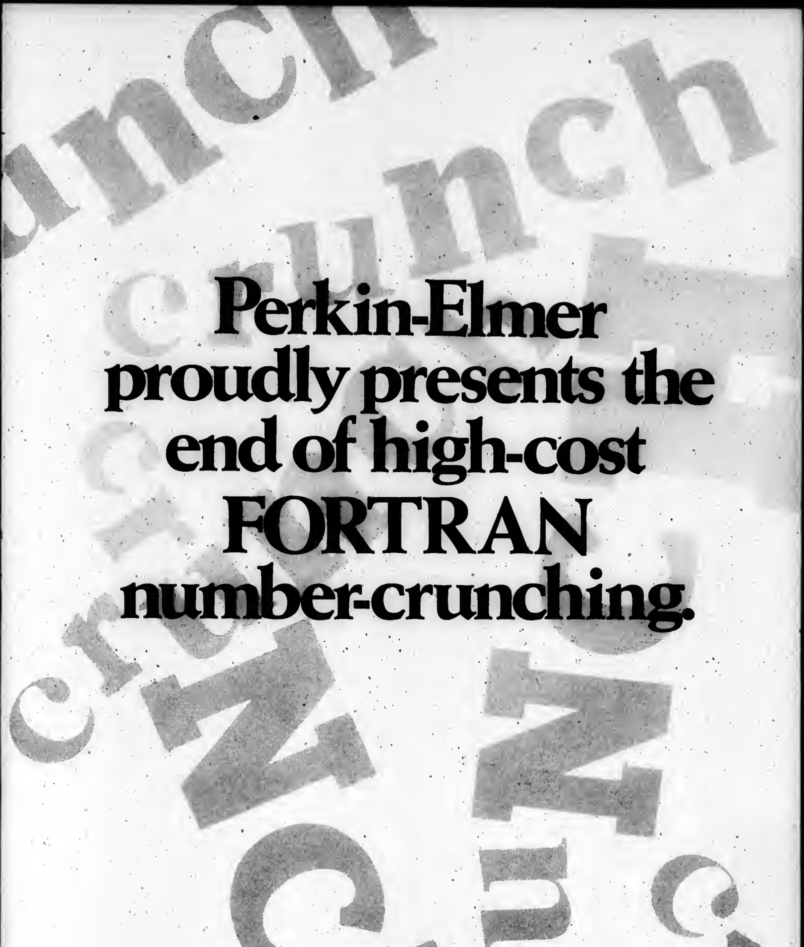

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| Matrix Manipulation (Gauss-Jordan Reduction) | 100 x 100 | 45 secs | 42.5 secs | [illegible] |
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| | 400 x 400† | 2555 secs | 3774 secs | [illegible] |
| Sharable Development Software | editor | Yes | [illegible] | |
| | linker | Yes | [illegible] | |
| | assembler | Yes | [illegible] | |
| | compiler | [illegible] | [illegible] | |
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# TRANSPOSITION ERRORS: A REBUTTAL

*(Continued from In Depth/2)*

- The right-hand transposed digit is in the second-from-the-right digit position of the number (because the divide-by-10 succeeded once).
- The left-hand transposed digit must be four positions leftward (because the successful ls divisor contained four ls.
- The left-hand transposed digit must be 8 smaller (in a positive entry) or 8 larger (in a negative entry) than the right-hand transposed digit (because the quotient from the successful ls divide was -8).

The reader may verify these assertions against the fabricated test case.

### Substitution Errors

A single-digit substitution error will produce an out-of-proof amount which contains exactly one nonzero digit. An EXAMINE (or, for advanced practitioners, an INSPECT) on the digits of the out-of-proof amount can detect this (number of zeroes + 1 = field width).

Alternately, divide repeatedly by 10 until the remainder is not zero. If the quotient is then zero, the condition holds.

Some digit substitutions are more probable than others because of visual similarities (0 vs. 9, 3 vs. 8, 1 vs. 7), so it is quite possible that the sign and single digit of the out-of-proof amount can select a small subset of entries for special examination. For example, if the out-of-proof amount is -50 and one of the entries is +335, it should be highlighted for early scrutiny as a possible substitution/mistranscription of 385.

(Similar digits on either side of the suspect digit, as here, increase the likelihood of a substitution error — or so thinks an amateur linguist-psychologist).

Note that if the single nonzero digit in the out-of-proof amount is a 9, we have ambiguity between the substitution test and the transposition test, as exemplified in Figure 2. For another example, an out-of-proof of -90 in a list of numbers which includes 4005 and 2345 might mean either that 4005 should be 4095 or that 2345 should be 2435 (or that both entries are correct and the error is elsewhere in the batch!).

### Insertion/Deletion Errors

Digit loss (e.g., 23745 becomes 2345) also leaves a distinctive but ambiguous footprint in the out-of-proof value. If y is the lost digit, and x is the number to the left of the lost digit, the out-of-proof amount will have the form:

$$10^N X (x - (10x+y)) = 10^N X (-9x-y)$$

This suggests we should divide the out-of-proof amount by 9 (after dividing off trailing zeroes), then search for an entry which begins with the same series of digits as the quotient.

For example, in Figure 6, 23745 is mistranscribed as 2345. The result of the equation implies that some entry 23XX should be 237XX.

Digit insertion uses the same calculation, but works the opposite way. In

*(Continued on In Depth/13)*

2345
-23745

-21400 / 9 = 23 R 7

Figure 6

## Why you can make more money selling a computer your customers have never heard of. Randal.

**You:** I already sell computers for big-name companies. Why in the world should I sell yours?

**Randal:** A number of reasons. One, we offer the highest gross margins in the business.

**You:** That's a good reason. What else?

**Randal:** Well, we won't compete with you. Our computers are sold *only* through our distributors.

We specialize in small business computers for businesses buying their first unit...you know what a large market that is. We'll provide you with everything your customers will need, from hardware to applications software. We have basic accounting packages available, and specific applications software is *immediately* available for the medical, dental, and building supply industries.

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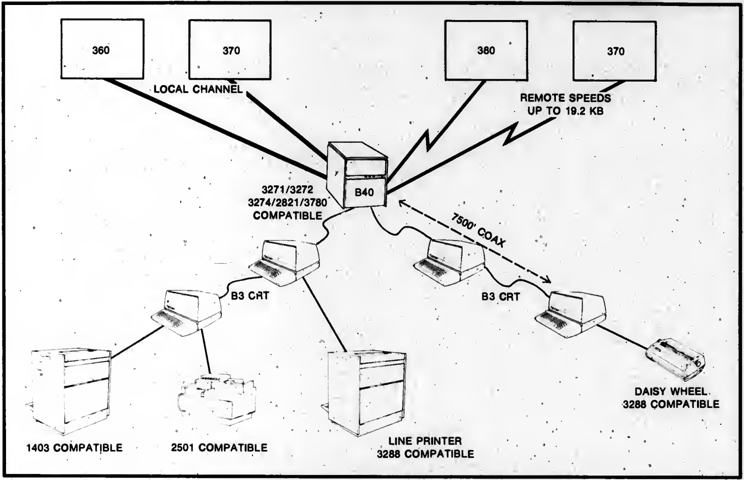
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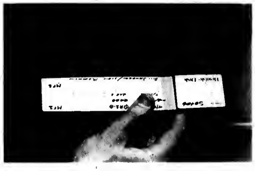

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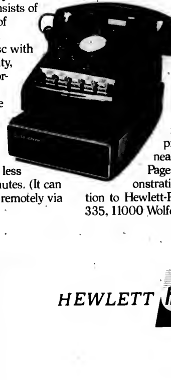

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(Continued from In Depth/7)

Figure 7, 2345 becomes 23345. The result of the equation implies that some entry 23ZXX should be 23XX.

If the last digit of the quotient equals the remainder or, if the remainder equals the first X digit of a particular entry, the probability of lost/added digits is greater because doubled digits are a more than random opportunity for insertion/deletion.

### Several Flags

All of these methods become more blurred if positive and negative entries are intermixed within a single batch. For this and many other reasons, it is desirable (when feasible) to design away from mixed-sign batches.

Alternately, positive and negative entries could/should be *separately* control-totaled within each batch.

What emerges from this mixed bag of candidate methods to catch errors is a batch transaction listing with several "candidate flag" columns, plus a loud warning that flags identify error candidates, *not* definite errors. Always check source documents.

What also emerges is an imperative need to audit the method in operation.

### Cobol Code Errors

There were several errors and implementation-dependent constructs in Kraus' Cobol code. The following list is incomplete:

- As noted above, *any* rearrangement of the digits in a number will yield an out-of-proof amount which is exactly divisible by 9. The code completely fails to verify that the quotient of the 9 division contains only one nonzero digit (the necessary, but not sufficient, condition for a single adjacent-digit transposition error), but rather assumes it.

Take a look at Figure 8, which assumes that 6275 became 6572 in transcription. The code will convince itself that it is looking for two adjacent digits in the second and third positions from the right, with the left digit three larger than the right digit, and will zing right past this erroneous item (and flag some innocent, correct item?).

- The text carefully stated that "digit positions will be counted from right to left." The code, however, carefully counts from left to right, completely invalidating itself.
- The text also carefully stated that "decimal points will be ignored," yet the crucial "divisible by 9?" text in the code divides an integer into a number with decimal places to yield integral quotient and remainder fields. Many implementations of Cobol will *not* carry the division into the fractional portion of the dividend with this combination of PICTUREs.

In any case, a remainder field that is not as precise as the dividend will destroy the validity of the division and cause all kinds of misrecognition problems.

- REMOVE-DETAIL-SIGN seems an odd name for a field whose PICTURE does contain the "S" sign character.

```
23345
-2345

21000 / 9 = 2 R 3
```

Figure 7

```
6572
-6275

297 / 9 = 33 R O
```

Figure 8

Moderately careful scrutiny of the Cobol code thus identified at least three errors — each of which is sufficient to completely destroy the effectiveness of the routine.

*Robert B. Higgins is currently the internal financial time-sharing consultant for the Industrial Chemical Group of FMC Corp. in Philadelphia.*

*He has been involved with commercial DP and Cobol for 14 years, having worked with the U.S. Army, hardware and software vendors, a university and a major New York City bank before assuming his present position.*

*Higgins, who has earned a bachelor of arts degree, also holds the Certificate in Data Processing.*

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- *Terminal selection — getting the most work out of the right terminal.*
- *Private line vs. public data networks — how users can best utilize either [or both] systems.*
- *Switched networks — choosing between circuit switching, message switching, and packet switching.*
- *Configuring in the '80's — microwave transmission and satellite links.*

Whether you're presently involved with data communications, or just looking, our November 28th Special Report will be of special interest to you. And if you market data communications products or services — this is a good place to get the word out. Ad closing date is November 10, and your *Computerworld* representative can give you all the details. Or, to reserve space, call Terry Williams at (617) 965-5800.

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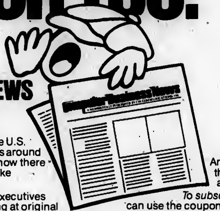

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## For Manufacturers, Distributors

# System/38 Offers Application Programs

ATLANTA — Although advances in semiconductor technology and operating system architecture highlight IBM's recently announced System/38 (CW, Oct. 30), the high-end small business system also offers two sets of applications software totaling 16 packages.

One set consists of five individually installable modules that reportedly allow distributors to interactively perform applications that traditionally have been done in batch mode. The other set includes 11 manufacturer-oriented packages that perform applications like material requirements planning (MRP) and the standard accounting functions.

Specifically, the System/38 distribution management system software includes packages for payroll, accounts payable and general ledger plus an on-line applications generation aid called the Display Information Facility (DIF). The other distributor module is an Inventory Management, Product Replenishment and Order Validity Evaluation (Improve) package.

The manufacturers' software, meanwhile, consists of applications packages for order entry and invoicing, accounts receivable, inventory management, sales analysis, general ledger, accounts payable, payroll, product data management, MRP, production control and costing, and data collection system support. Together, these 11 modules are called the System/38 Manufacturing Accounting and Production Information Control System (Mapics).

Using Improve, the System/38 can help users forecast inventory demand by extrapolating from previous records, according to an IBM spokesman. The package also helps users estimate the optimum lead time they should allow for ordering inventory replacements, and it aids selection of the lowest priced items. Priced at $150/mo, Improve becomes available in July 1980.

### Payroll Package

The payroll package produces weekly, biweekly, semiweekly and monthly payroll checks as well as calculating gross-to-net pay for hourly and salaried employees and monitoring pay rates, shift differentials, taxes, voluntary deductions and exceptions. Available for a $50/mo license fee, the package is also said

*(Continued on Page 62)*

# Users Urged to Centralize Plans When Distributing Mini Systems

**By Howard A. Karten**
CW Staff

CHICAGO — The control of DP activities in companies with geographically dispersed divisions, or divisions engaged in unrelated activities, can be accomplished with minicomputers in each division, but the planning for these DP activities must be centralized if they are to be successful, speakers agreed at a panel on "Managing the Proliferation of Minicomputers" at a recent conference here.

Richard C. Williams, manager of systems design and planning for Continental Forest Industries, Inc., explained that his company has dealt with the twin problems of controlling DP activities and applying minicomputers to business needs by providing centralized planning and decentralized implementation of DP activities.

Defining roles as "planning" or "implementation" is important, Williams said, because the equipment selection process calls on a central pool of expertise while relying on those most familiar with the individual wrinkles of a business to solve their own problems.

Two factors in particular have prompted his company to take this approach, the manager said. The first is that the company has 60 business locations, producing eight major product lines; the second stems from the fact that talking about economies of scale might no longer be valid for mainframes and minis.

Describing his company's DP gear as "a virtual zoo, with Burroughs, IBM and other vendors' equipment," Williams said his company's divisions employ 46 DP persons, half of whom are engaged in nonanalysis activities, such as operations and data entry. "Many of them got their experience on tab equipment," he added — a background that encouraged approaches better suited to tab equipment than to modern DP concepts. In addition, local division or plant managers have a tendency to buy hardware ill-suited to its intended task.

### Decentralization Wins Convert

Sharing the podium with Williams was H. George Connell, who described the situation that existed when he joined Bangor Punta Corp. of Greenwich, Conn., several years ago as director of information systems.

Stating that "Most senior managers [of the company's divisions were] largely out of touch with the DP function," Connell said he worked closely with them to provide education and evolve individual systems plans.

Describing himself as a "convert from the idea of centralization of DP," Connell told how circumstances similar to those at Continental Forest Industries helped him choose decentralization.

Williams noted that his company, with a yearly systems budget of $3.6 million and a telecom-

*(Continued on Page 58)*

# *Firm Speeds Deliveries Of DEC Replacement Parts*

SAN FRANCISCO — Users of any Digital Equipment Corp. computer system can reportedly receive spare parts for their equipment faster and less expensively from an independent service firm here than from DEC or its authorized dealers.

World Data Corp. (WDC) typically requires only a week to 10 days to ship DEC replacement parts to users anywhere in the U.S., according to the company's president and sole full-time employee, Marvin Bennett.

WDC's shipment lead time thus represents a 14-day improvement over DEC's parts delivery schedule, Bennett said.

Moveover, the independent service company offers users a 5% to 10% greater discount for spare parts than DEC, whose own discounts typically range from 8% to 25%, he added.

Although WDC's service is said to cover DEC's complete computer systems line, the firm specializes in parts for the PDP-8 and PDP-11 series. The company's parts inventory for those two families contain all the items listed in DEC's part catalog, including cables, logic chips, supplies and documentation.

WDC also supplies "spares kits," which, depending on their size, range in cost from $200 to $20,000 and provide enough parts for up to a year's operation. A spares kit's contents typically include items like reset buttons, switches, memory boards and logic chips, Bennett said.

All WDC-supplied parts are warranted for 90 days from time of shipment. The company requires a minimum purchase of $250 and is located at Suite 277, 519 Castro St., San Francisco, Calif. 94114.

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# *Winchesters Get Backup*

SAN DIEGO — Users can reportedly provide backup for their Winchester-type disk units as well as meet their business systems storage needs with a 6,400 bit/in. cartridge drive unit from Tandberg Data, Inc.

With a cartridge containing 300 feet of tape, the TDC 3164 provides backup for a 10M-byte Winchester disk unit; with a cartridge containing 450 feet of tape, the product backs up a 20M-byte disk unit. In either case, the storage system transfers 192k bit/sec.

Three hardware modules comprise the tape drive unit: a TDC 3100 drive mechanism 6,400 bit/in. four-track head and single-board electronics assembly.

First shipments of the $1,750 tape unit begin in January from 4060 Morena Blvd., San Diego, Calif. 92117.

# Users Urged to Centralize Plans

*(Continued from Page 57)*

munications budget of $3 million, obtains minis "scaled to the size of our business units." This approach provides ease of use, which means a legion of support people — such as tape handlers and forms handlers — are not needed in an installation.

The centralized activities provided by both companies include consulting with local users, planning and review, prompting local users to action and formulating strategies.

In contrast, activities at a local level include detailed planning, implementation and collating of system requirements. Establishing charters for these activities can be difficult, Williams noted.

### Controlling DP Activities

Williams outlined the method by which DP activities are controlled under his company's system. These activities include extensive user contact, formal approval by headquarters, concurrence review and formal and informal project monitoring. Nonfinancial management objectives, in which division managers produce annual systems plans, are also used.

Included in these activities are a formal written plan submitted by local users, with project milestones and a review of activities, Williams explained.

This method is not without its flaws, the speaker conceded. First of all, the people doing the implementation are "the salt of the earth," Williams said, "but in some cases they don't know much about DP."

Moreover, "there is some noncooperation" because the cost of the DP equipment is often small compared with the remainder of the division's budget. "In a $60 million operation, DP equipment may only account for .4% of the budget," Williams said. There is a tendency for managers to overlook or not be concerned with this time.

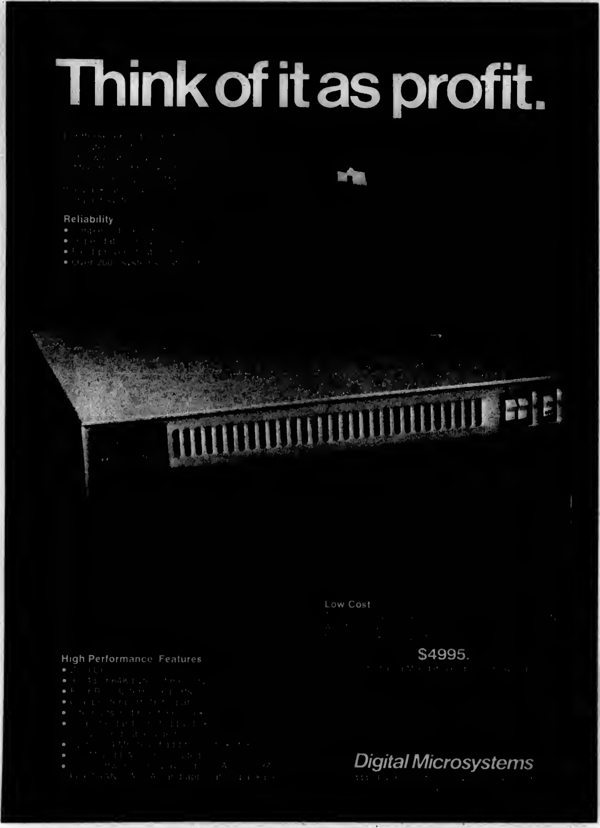
### Salaries and Salesmen

Adding to the hitches mentioned by Williams, Connell said, were two he had encountered: salary problem and difficulties with overenthusiastic salesmen.

Addressing the issue of salaries, Connell noted the difficulty of finding competent people. To make matters worse, the competition is stiff for the few qualified people who do exist. As a result, Connell cannot easily find and hire programmers at attractive salary levels "without rupturing the whole salary structure" of a division.

Vendor problems fall into two categories, Connell added. First, despite the policy of centralized purchasing decisions, systems "were often acquired by 'the back door'" from fast-talking salesmen and often not used to best advantage.

Additionally, the rapid expansion of many minicomputer manufacturers has resulted in salesmen who know hardware, but not applications. Unlike the larger mainframe vendors, minicomputer vendors do not provide good advice, Connell asserted.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# Mini May Help Grad School Attract Students

**By Marguerite Zientara**
CW Staff

RICHARDSON, Texas — Striving to bolster its sagging enrollment, the Graduate Social Sciences School of the University of Texas (Dallas) acquired a multiuser minicomputer system 10 months ago to analyze statistics, perform selected administrative functions and help students do their homework.

Whether the system will induce additional students to study here as school administrators hope remains to be seen. One fact, however, has already clearly emerged: the system "has made this institution one of the most sophisticated social science data analysis schools in the country," according to David J. Morgan, director of the university's Data Analysis Laboratory.

The Social Sciences School became the first user of Wang Laboratories, Inc., 2200MVP multiuser system last December after searching two years for hardware to meet the institution's DP needs.

The school previously used the university's IBM 370/155 and Digital Equipment Corp. PDP-11/45 but experienced unacceptable lead times with that equipment.

"We couldn't get quick enough turnaround time for interactive use."

"Since the students were doing simple statistics problems, we didn't want to wait an hour for a batch turnaround job averaging six or seven numbers."

The school also felt that purchasing its own computer would "establish a sense of professionalism and individuality that all 500 of our students could share," he added.

### Limited Search

The institution limited its search for replacement hardware to multiuser systems with extremely fast processing speed, the ability to enter jobs remotely into the 370, the capacity to accommodate at least eight terminals and, most important, ease of use, Morgan said.

School officials also strove to spend less than the $60,000 in grants the school received from the state in 1975.

In searching for a system, the school considered several Hewlett-Packard Co. systems, Basic/Four Corp. equipment, the Data General Corp. Nova line of minicomputers and DEC's PDP-11/45 and 11/34, in addition to the Wang machine.

Because the DEC and the Wang equipment all could expand to eight terminals, Morgan and his associates benchmarked the systems by comparing their ability to invert matrices, a function often performed in statistical applications, Morgan said.

The Wang MVP system inverts a 30-by-30 random matrix in nine seconds for a machine cost of about $25,000, while the other systems took 35- to 61 seconds and cost $30,000 to $40,000, Morgan said.

Morgan wanted to use Basic because the machine would be used for education and found that Basic was executed faster in the hardwired Wang equipment than in DEC's software.

Another deciding factor was DEC's requirement of maintenance payments for its interpreter, while Wang supplied updates free, according to Morgan.

The School of Social Sciences' Wang 2200MVP system incorporates a multipartitionable CPU, four 2236D terminals and one 240 line/min printer. It also uses a 10M-byte disk unit, one IBM-compatible flexible diskette unit and a 2227B telecommunications I/O board, he noted.

The system has been running smoothly since late January, Morgan said, but in the previous month several changes had to be made. Since the school has Serial No. 1 of the Wang line, Morgan explained, some of the software hadn't been converted to run in a multiuser environment.

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## HP Tape Unit Enhanced

PALO ALTO, Calif. — Two enhancements to the Hewlett-Packard Co. 7970E tape unit — an interface/-controller and a modified cabinet — are said to ease connection of the mass storage system to HP computers.

Compatible with HP's IEEE 488-1975 standard interface bus, the interface/controller fits within the tape unit rather than within a host CPU. As a result, it requires only one cable to connect to a host system.

The microprocessor-based controller reportedly accommodates up to four tape drives and provides each with onboard intelligence.

A 7970E with the interface/controller and cabinet forms a 7970E Option 426 subsystem, which costs $12,000; HP is located at 1501 Page Mill Road, Palo Alto, Calif. 94304.

### Starting Nov. 30

## Series of Reports Will Provide User Ratings of Small Systems

CHICAGO — The first in a series of small systems user satisfaction reports will be available Nov. 30 from the Customer Satisfaction Research (CSR) Institute.

Until now the institute specialized in research oriented to vendor's needs. However, with the six separate reports slated to appear later this month, it hopes to become the consumer guide for the DP industry, according to Joanne Ewertz, director of Computer Central Services Division at CSR Institute.

The reports, Ewertz said, will be particularly useful for "the first-time computer user or for the user who made a mistake the first time around and doesn't want to make a second mistake."

Samples of the final reports were not distributed at the Information Management Exposition & Conference (Info' 78) held here recently. But Ewertz explained the first group of reports will include user satisfaction ratings of small business systems manufactured by Burroughs Corp., Digital Equipment Corp., IBM and NCR Corp. and of dedicated minicomputers from Data General Corp. and DEC.

### User Satisfaction Ratings

Priced at $35 apiece, each report rates — on a scale of one to five — user satisfaction with various aspects of one vendor's system or equipment. The factors rated by users include price, hardware reliability and throughput; software support, sales. representative support and installation.

Using a weighted average, CSR Institute computes a user rating for each of the factors for each company and calculates an average and a range of scores for 10 manufacturing companies combined.

"Each company is user-rated to the industry at large, but companies are never directly compared," Ewertz said. "CSR Institute does not make recommendations of specific products. Rather, we let users make their own comparisons."

### Recent Product Offerings

The user satisfaction series focuses on recent product offerings or the most popular models of the vendors selected for ratings. Moreover, the systems or individual minicomputer must have been installed at the user's site at least 90 days prior to the evaluation interview. Users are interviewed by telephone.

After the institute decided to offer the service to users, Ewertz said she interviewed users and nonusers alike to discover what kind of information they would like to see included in the reports.

CSR Institute's Computer Central Services Division is located at Leawood Manor, 4901 College Blvd., Shawnee Mission, Kan. 66211.

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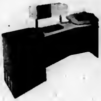

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# Serial Impact Printer Outputs 55 Char./Sec

LEXINGTON, Mass. — Plug compatible with Qume Corp.'s character printers, a serial impact printer from NEC Information Systems, Inc. reportedly incorporates a "thimble" output mechanism that holds up to 128 alphanumeric characters.

By contrast, the Qume units, which are replaced by the Model 5500Q Spinwriter, provide a daisy-wheel printing mechanism.

Rated at 55 char./sec, the microprocessor-based printer comes in two versions: one with 10 char./in. output and the other with 12 char./in. output, each with proportional spacing. In its 10 char./in. version, the unit produces 136-column lines; in its 12 char./in. version, 163-column lines.

Regardless of the line width, the Model 5500Q emits 67 dBs with its cover removed and 60 dBs with its die-cast aluminum cover installed. In addition to producing subscripts and superscripts, both versions provide 1/120 in. horizontal positioning resolution and 1/48 in. vertical positioning resolution.

For end users, the printer costs $2,169; for OEMs, $1,140 in lots of 100. NEC Information Systems is located at 5 Militia Drive, Lexington, Mass. 02173.

# System/38 Offers Packages

(Continued from Page 57)

to provide on-line editing, search files and one-time information entry.

With the accounts payable package, users can produce management reports and select open times for payment, the source noted. Other functions include check writing and reconciliation, invoice distribution and invoice payment selection. The package is available for a $40/mo license fee.

General ledger software, meanwhile, produces year-to-date income statements and balance sheets and compares current financial reports with previous records. Using a double-entry bookkeeping system, the package leases for $40/mo and, like the payroll and accounts payable programs, will become available in May 1980, the spokesman said.

The DIF package helps develop programs that aid on-line access to data files and permits creation of custom-written programs by combining searches, inquiries and lists with functions unique to a user, the source added. When it becomes available in May 1980, the DIF will cost $50/mo.

### Mapics Software

Shifting his attention to the Mapics software, the IBM spokesman credited the order entry and invoicing package with verifying credit and providing access to information like blanket order status. The package is also said to help prepare invoices, shipping labels, packing lists and bills of lading. Users can acquire the programs for a $60/mo license fee.

The accounts receivable package, which leases for $40/mo, records customer charges, cash payments, credit and debit memos and other adjusting entries, the spokesman explained.

With Mapics' inventory management package, users can reportedly update inventory balances as they enter transactions and can calculate on-hand, on-order and allocated quantities based on issues, receipts and shop-order releases. The package leases for $51/mo.

For a $50/mo license fee, the sales analysis module helps identify buying trends by tracking sales performance by product or salesman, the spokesman added.

The Mapics general ledger program, meanwhile, provides periodic or on-demand financial reports and leases for $40/mo. With the package, users can reportedly organize general ledger data by department with comparative income statements or tailor it to management's chart of accounts.

### Accounts Payable

Mapics accounts payable package records vendor invoices and credit memos and leases for $40/mo. With the module's on-line inquiry capability, users can display open payables information about vendors.

Using the Mapics payroll program, users can also calculate wages, taxes, deductions and net pay as well as print checks and update files for various classes of pay plans, the IBM source said. The payroll software is available for a $50/mo license fee.

The product data management package maintains bills of material, manufacturing routes and information about each of a user's work centers. Available for a $90/mo license fee, the product also keeps engineering and cost records, the spokesman added.

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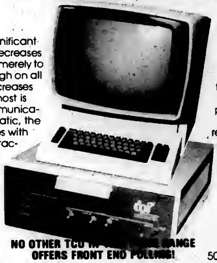

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Normal SDA II autopoll takes significant channel time and significantly decreases available host processing time—merely to poll terminals. This overhead is high on all host systems and especially decreases system performance when the host is operating with Integrated Communication Adapters (ICA). Using Pollmatic, the reduction in host overhead varies with the application but in purely interactive systems (where a response is sent to a message from a terminal before polling resumes) host polling overhead can be reduced to less than one-half of one percent of the host overhead with Pollmatic and terminal response time is not affected.

This reduction in host overhead is accomplished by employing a flexible polling algorithym in the CMC whereby several of the parameters are user selectable on a per line basis

The Pollmatic feature is completely transparent to the host software providing the index byte (and not the channel residual byte count) is used to indicate from which terminal a non-NAK response has been obtained.

The CMC is a high performance micro-processor directed controller that emulates the IBM 2701 and 2703 transmission control units for IBM I, II, III, TTY II and SDA II line disciplines. It occupies less than 1.3 cubic feet of space and can replace up to two IBM 3704's or IBM 2701's at a fraction of their combined cost. EIA RS 232-C and wideband interfaces offer high throughput in an extraordinary reliable and compact package.

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## For Bilingual Instruction

# School Shifting Teaching Aid to Micros

**By Ann Dooley**
CW Staff

DALLAS — A unique bilingual instruction system designed to help Spanish-speaking grade-schoolers here is being converted from minicomputers to microcomputers in an attempt to lower costs.

The Dallas Independent School District, which developed the computer-assisted instruction (CAI) program, is currently in the process of switching from a Digital Equipment Corp. PDP-11/34 time-sharing system to a microcomputer-based system using Radio Shack Corp. TRS-80s and Mits Altair microcomputers. The DEC PDP-11/34s were fine as far as they went, but they simply proved too costly to operate on a large scale, according to Bill Gattis, principal analyst for the Dallas School District.

The school district wants to expand the system around the city and there is no way that can be done using the minis, he noted. Currently cost per student-hour of use is around $2 to $2.50 and the district's goal is to lower that rate to 50 cents per student-hour. And the only way to do that is by using micros and finding a lower cost voice synthesizer, he said.

### Two-Pronged Program

The program, which is in its second year of operation, is comprised of a math program and a Spanish/English reading and language comprehension program. The Spanish/-English program is now in use at only one school, the Gabe Allen Elementary School, whose students are nearly 100% Spanish speaking and between the ages of six and eight.

The system was programmed to store a student file for each child with his name, both in print and in text, for the voice synthesizer so the system speaks to each child by name. The student file also includes a student number, a personal message for the day and the lesson the student is working on or is about to begin.

A first grade student begins learning with the system by identifying the letters of the alphabet in Spanish. The system teaches the child in Spanish while he is learning English in class and then starts using English once the child has mastered the language sufficiently.

Three Spanish-Speaking Grade-Schoolers Using Bilinqual Computer-Assisted Instruction Program.

### Supplement to Teacher

The system is intended to supplement the teacher's efforts. There is a shortage of bilingual teachers, and this system can keep the child at a learning level in Spanish equal with other students until he or she has sufficiently grasped English, Gattis said.

The conversion occurs when both the system and the teacher determine it is appropriate. Because the system is self-paced and individualized, children lose their fear of competing with other children in a strange language, he noted.

*(Continued on Page 66)*

# Word Processing Software, Z80 Assembler Introduced

NORTHRIDGE, Calif. — A reentrant word processing package that provides multiuser capabilities and a Z80 macro assembler that can also run on 8080 systems have been introduced by MVT Microcomputer Systems, Inc.

The MVT-Wordflow package uses S-100 bus equipment and the Famos multitasking disk operating system. The package lets four or more users simultaneously use the reentrant editor and output programs and lets the micro provide computational support even while multiple report or letter editing jobs are in process.

Among other features, the text editor program reportedly includes search/replace commands; scroll and position control; character, word, line or page insertion or deletion; and block transfers.

The Z80 assembler supports nested macro calls and nested macro definitions, with up to 10 parameters, the firm said.

The programmer may select from various listing options and formats including a complete cross-reference table where options and formats may even be specified dynamically in the source program. The assembler and linkage editor support up to 450 global symbols, the company said.

The MVT-Wordflow costs $400 and the A80 macro assembler $375 from MVT Microcomputer Systems, Inc., Suite 203, 9241 Reseda Blvd., Northridge, Calif. 91324.

# Micro Chips

## Branch of Computerland Now Open in Honolulu

SAN LEANDRO, Calif. — Computerland Corp. has opened its 50th store in the 50th state.

The new store is located at Kawaiahao Plaza, 567 S. King St., Honolulu, Hawaii, and is owned and operated by Bob and Pat Moore.

The firm said it plans to have some 70 stores in operation by the end of this year.

Computerland Corp. is located at 14400 Cataline St., San Leandro, Calif. 94577.

## Novices Given Reference Aid

DEDHAM, Mass. — *The Computer Book* from Artech House is intended as a reference guide for the novice computer user or the professional, the publisher said.

Designed in a workbook format, the publication includes information on number systems and codes, memories, peripherals, programming, languages and microcomputers.

The book costs $28 from Artech's Computer Department, 610 Washington St., Dedham, Mass. 02026.

## Parisian Show Set for May

PARIS — Micro/Expo '79 will be held here May 15-17 at the Centre International de Paris. The show, which is in its fourth year, has doubled in size and attendance every year — an indication of the growth in the European personal computing market, according to the show's sponsor, Sybex, Inc.

The conference will be held in English and French and will focus on new products, industrial applications and personal computing.

For additional information, contact Sybex, Inc., 2020 Milvia St., Berkeley, Calif. 94704.

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# Disk Operating System Supports 6800-Based Units

SAN DIEGO, Calif. — Electronic Product Associates, Inc. has introduced a disk operating system for Motorola, Inc. 6800 microprocessors with at least 24K of random-access memory (RAM) and a floppy or other kind of disk drive.

SDOS can support 64K of RAM and any number of compatible disk drives on-line and will reportedly support files on any storage device capable of holding up to 2.15 billion bytes. SDOS supports both random and sequential disk files, device-independent I/O, a user-customizable command interpreter and tailoring of the disk drives and can be adapted to most disk hardware, the firm said.

New disk files can be created automatically and SDOS performs space management dynamically so files can grow or shrink as desired, according to the firm.

The assembly language interface to SDOS is the same as the Software Dynamics, Inc. (SD) I/O package interface, so all available SD software can be run under SDOS with change, the firm said. The Command interpreter allows the user to invoke any program, including Basic programs compiled by SD Basic, by simply typing its name, the firm added.

SDOS costs $250 from Electronic Product Associates, Inc., 1157 Vega St., San Diego, Calif. 92110.

## *Physicians' Research Aided*

OSLO, Norway — A data system designed for physicians who wish to conduct independent research and statistical projects has been unveiled by A/S Mycron.

The Mycron SDS system fits on a desk and allows doctors to record both general and medical data collected during patient consultations and treatments as well as other statistical data.

Using a Tandberg Radio Fabrik's A/S-type TDV 2115 computer designed at the University of Tromso, Norway, the system can be modified to meet specific requirements.

The Mycron SDS costs $12,000 without a CRT and is available from A/S Mycron, P.O. Box 6199 Etterstad, Oslo 6, Norway.

# Book Rates Minis, Micros

SAN JOSE, Calif. — SBS Publishing Co: has released *The Kips Book — Mini/Microcomputer Performance Evaluations*, that compares the performance of 35 leading minis and micros in situations where either could be employed.

The products are analyzed as to various criteria associated with particular applications. Along with the criteria checklist are tables on character analysis, task analysis and business and operational analysis. These tables combine technical, operational and business factors to form a cohesive evaluation process, according to the publisher.

Performance evaluations were conducted for the major product offerings from Digital Equipment Corp., IBM, National Semiconductor Corp., Data General Corp. and many other companies.

Five sets of instructions and products were compared to determine performance in science, business and utility areas, the publisher said.

The 160-page report costs $995 from SBS Publishing, Suite 190, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

## Digital Group Users Gain CP/M Version

PEORIA, Ill. — General Technics, Inc. is offering a version of the Digital Research CP/M floppy disk operating system configured for Digital Group, Inc. microcomputers.

Digital Group users can now use CP/M to exchange programs with users of other systems as well as use the software that runs under CP/M, including Basic, Fortran IV, Cobol and several business packages, the firm said.

This implementation of CP/M is compatible with other CP/M systems and runs on any standard Digital Group 8080 or Z80 system having a minimum of 18K contiguous memory and one full-size floppy disk drive, according to the company. The system can accommodate up to four disk drives, the firm said.

The CP/M test editor, 8080 assembler, debugging tool, peripheral interchange program, relocator and utilities are included. The package comes with diskette, bootstrap read-only memory, CP/M manuals and documentation for $100 from General Technics, Inc., 1515 W. Main, Peoria, Ill. 61606.

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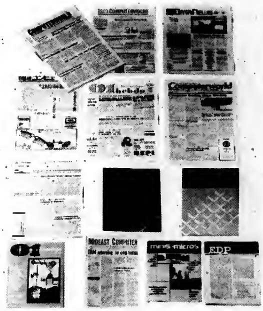

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| W. Germany | 6,527 | 7.9 | 3 |
| United Kingdom | 4,794 | 5.8 | 4 |
| France | 4,768 | 5.8 | 5 |
| Canada | 2,301 | 2.8 | 7 |
| Italy | 2,119 | 2.6 | 8 |
| Australasia | 2,044 | 2.5 | 9 |
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# School Switching to Micros for Cost Savings

*(Continued from Page 63)*

Since the system is being used by very young children, the system also was programmed to be as personal as possible. In addition to saying "good morning" or "good afternoon" to the child by name, children's birth dates are keyed in and the voice synthesizer sings "Happy Birthday" to each child on his birthday.

The students use earphones to hear the voice synthesizer, which is the only one of its kind to speak both Spanish and English, Gattis said. Visual graphics accompany the oral lessons to facilitate learning, he added.

Called Rolar by its young students, the system emphasizes reading readings, consonants, vowels, blends, comprehension, vocabulary, spelling, rhyming and syllables.

The system was also programmed to provide mathematics instruction to children from kindergarten through eighth grade, Gattis said. This part of the program has already been implemented on the TRS-80 microcomputers and has begun in seven schools in the Dallas area.

The system helps students drill and practice basic math concepts such as addition, subtraction, multiplication and division. In addition, it is keyed to each grade level and cross-referenced to several of the major math textbooks.

Both the bilingual and the math programs have been received very favorably by both students and teachers. Students respond well to the individualized private instruction, and although the results have not been formally analyzed, teachers have reported great improvements in the students' scores throughout the school year.

The program, which was designed by the Dallas School District in conjunction with the Foundation for Quality Education, Inc. of Dallas, was written in Basic with support from the Author programming package. Much of the programming and interfaces had to be designed by Gattis since there was no prototype to follow. "In fact, we had to develop Spanish character read-only memory (ROM) for the Spanish text," he noted.

# Memory Expander Holds 8K Prom, RAM

DERBY, Conn. — The MEB-1 memory expansion box now available from E&L Instruments, Inc. accommodates 8K of random-access memory (RAM) and 8K of programmable read-only memory (Prom) and provides users of the company's 8080A-based MMD-1 microcomputer system with facilities for high-level languages or software development.

The unit includes power supplies, decoding and interconnection facilities that permit interfacing with other E&L micro products or peripherals. Units may be combined to provide memory expansion up to 64K bytes.

The MEB is supplied with 2K of RAM installed. Additional RAM is available in 2K blocks. No Prom is supplied, but blank-type 2708 Prom for the MEB-1 is available in 1K blocks.

The MEB-1 costs $300 assembled or $230 in kit form from E&L Instruments, Inc., 61 First St., Derby, Conn. 06418.

# MFE Adds I/O Board

SALEM, N.H. — A serial I/O board, Option 404SER, now available from MFE Corp. provides a universal interface for the firm's Model 450B digital cassette transport.

The I/O board can be used for all applications in which the user's interface or data stream is already in serial format, the firm said. The serial I/O option includes a dual speed control that allows programmed selection of read/-write, search, rewind/fast forward, adjustable write oscillator and Biphase-level encoder/decoder circuitry.

For special micro and minicomputer applications, MFE offers the separate Universal Parallel I/O Option 414PAR. Both options plug into and become part of the MFE Model 450B.

The serial I/O interface costs $135 from MFE Corp., Keewaydin Drive, Salem, N.H. 03079.

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# Brazil Takes Steps to Hatch Mini Industry

**By Nancy French**
CW Staff

RIO DE JANEIRO, Brazil — The Brazilian government has taken radical action to ensure the development of a domestic minicomputer industry here. The action involves two basic steps — setting a ceiling on all computer imports ($130 million this year) and selecting and authorizing a limited number of local concerns to begin manufacturing equipment.

The quota system protects the Brazilian firms so they can flourish and employ high-level Brazilian technicians, according to Ivan de Costa Marques, technical director of Digibras, the government holding company that works with firms formed with national capital. De Costa Marques is considered by some sources here to have been the architect of this plan.

The national policy has been evolving for the past six to 10 years and grew out of a realization that to establish independence in technological fields and to decrease this nation's dependence on more developed countries — particularly on minicomputers which are needed for military applications — a domestic industry must be established and protected.

Minicomputers, rather than large systems, were also chosen for several other reasons: less investment was required, the technology was easier to develop and the market for minicomputers was seen to be far greater than that for larger systems. For these reasons, the government decided to "reserve" the minicomputer market for "Brazilian free enterprise."

Critics of the plan see it as a big gamble, one that may leave Brazil without sufficient, effective computer power to meet the demands of this fast-growing economy.

Five companies have received approval to manufacture minis to date and approval will be given to as many others as

*(Continued on Page 70)*

## *Fairchild Joins Four Others*

# Firm Starts $30 Million Suit Against DG

**By Marica Blumenthal**
CW Staff

SAN FRANCISCO — With the filing of a $30 million suit against Data General Corp. here on Oct. 16, Fairchild Camera & Instrument Corp. became the fifth company to institute antitrust action against DG.

Other companies involved in antitrust litigation with DG include Digidyne Corp., Ampex Corp., SCI Systems, Inc. and Bytronix Corp. Some of these actions are countersuits made in response to suits filed by DG against those companies charging them with misappropriation of trade secrets.

While the five suits vary somewhat, most charged that DG, through restrictive software licensing arrangements, is unlawfully tying the marketing of its software and hardware.

Another charge common to most of the actions alleges that DG is making a deliberate effort to drive competitors that make DG-compatible Nova processors out of the market using charges of misappropriation of trade secrets.

### Fairchild's Countersuit

Fairchild's countersuit seeks injunctive relief invalidating DG's software license agreements. At the heart of the suit, Fairchild contends that its 9440 Microflame microprocessor — which emulates DG's Nova 1200 — is based on Fairchild's proprietary Isoplanar Integrated Injection Logic technology, not DG-developed technology.

Fairchild argued in its suit that DG's suit was based on "the false contention that DG is entitled to claim as a trade secret the same material which it has widely published and . . . therefore it is virtually impossible for any competitor to manufacture a Nova-compatible processor without infringing on [DG's] trade secret claims."

Moreover, Fairchild charged that DG has "embarked on a program to sue Fairchild and every other competitor who attempts to market a Nova-compatible processor on the purported ground that the competitor unlawfully obtained and misappropriated DG's trade secrets in order to manufacture a competing processor."

DG's suits, Fairchild contended, were brought to harass and intimidate potential purchasers of Nova-compatible processors and to deter them from purchasing from DG's competitors. Aside from the anticompetitive activity, DG has attempted to impede technological development, Fairchild

*(Continued on Page 72)*

# Memorex Projects Earnings To Help Bolster Stock Price

**By Marcia Blumenthal**
CW Staff

SANTA CLARA, Calif — Although Memorex Corp. rarely makes projections of future earnings, it did so recently in an attempt to bolster the price of its stock, which plunged after the company announced its third quarter financial results.

For the third quarter, Memorex said earnings of $9.9 million or $1.30 a share were "disappointing" when compared with last year's third-quarter earnings of $8.3 million or $1.26 a share.

Revenues for the quarter climbed to $152.6 million, a 34% increase from 1977's third quarter revenues of $114.1 million.

In a special statement made after the earnings were announced, Robert C. Wilson, chairman and president of Memorex, said, "The price of Memorex stock has fallen more rapidly than the market recently. Although our third quarter was solidly profitable and results were above those for the prior year, they were evidently below the expectations of investors. We believe that fourth quarter earnings will be in the range of $1.40 to $1.60 per share."

Analysts had pegged Memorex earnings in the $1.40 to $1.50 per share range for this quarter, a Wall Street observed noted.

In attempting to put the company's plum-

*(Continued on Page 68)*

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# Memorex Projects Earnings to Bolster Stock

(Continued from Page 67)

meting stock price into perspective, a spokesman said the company had a strong second quarter followed by a relatively flat third quarter. This, compounded with a particularly depressed stock market during the Oct. 16 trading week, may have prompted investors who purchased Memorex stock at even lower prices earlier in the year to sell, realizing a gain in a dropping stock market, he continued.

In the past 12 months, the price of Memorex's stock has fluctuated between $24 a share and $60 a share. During the week of Oct. 16, the price of Memorex's stock on the New York Stock Exchange composite tape dropped from $49.125 to $36.25.

Commenting on the market reaction, two analysts concurred that the drop in the price of Memorex stock was not the result of any inherent weakness in its financial position, but rather, was fueled by expectations generated for the company's financial performance by Wall Street.

"What happened is totally outside of what is happening in the computer industry," one of the analysts observed. It may take Memorex stock months to recover from the effects of the recent market activity, he continued. "This happened to Burroughs Corp. a while back, and it happens, in a mild way, to Digital Equipment Corp. every so often.".

Yet a third analyst said, "High technology stocks ran up rapidly this year, and as the market has weakened, profits were taken in those markets more rapidly than in others."

However, he did point out that many companies with product lines like Memorex's have reported better earnings results.

### Disk Product Shipments

One possible problem, he theorized, may be with shipments of Memorex's IBM 3350-compatible disk products, a rapidly growing area for Memorex. Memorex has been gearing up to ship 150 to 200 of these systems a month, and being off by 30 or 40 units a month may affect earnings, he explained.

In addition, IBM reduced the purchase price of its 3350 disks by 20%, he noted.

On the whole, the analyst concluded, "If Memorex is going to earn more than $6 a share for its fiscal year, then the price of the stock should be higher than it is now."

For the year to date, Memorex's earnings were $37.8 million or $5.27 a share compared with earnings for the 1977 period of $40.6 million or $6.43 per share.

Revenues for the first nine months of 1978 were $450 million, a 38% increase from revenues of $326.1 million for the same period a year ago.

In commenting on third quarter results, Wilson said, "Although quarterly income before extraordinary credit was about the comparable 1977 quarter, it was disappointing in view of the higher revenue, the one-time benefit from the sale of the company's holding of Computer Communications, Inc. stock, a lower effective tax rate and reduced costs of the IBM litigation.

"Profit pressures included manufacturing cost variances, costs associated with new products and our rapid growth and decentralization of operations. The fourth quarter has traditionally been our best revenue quarter and profits should benefit accordingly."

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## *Lawyer Cites Unresolved Issues*

# Public Data Retrieval Viewed Benefit, Bother

**By Jake Kirchner**
CW Washington Bureau

WASHINGTON, D.C. — The prospect of a U.S. market for public data base retrieval systems, such as the Viewdata system being pilot tested in the UK, is a "good news-bad news" situation, according to one DP industry observer.

The good news is that the systems are available, they are exciting, there is a need for them and there is a market for them, according to John L. Bartlett of the Washington law firm Kirkland and Ellis. The bad news, he said, is that in the end, "the lawyers are going to be involved."

Bartlett, addressing a symposium at the National Academy of Sciences (NAS), noted that substantial legal and regulatory issues must be resolved before teletext and videotext systems can be fully developed and marketed in this country.

### TV Displays Information

The systems, which use a television set to display computerized information accessed either by telephone line (Teletext) or by television broadcast (Videotext), are being developed and publicly tested in several European countries, most notably the UK and France.

The symposium held here recently, sponsored by the Board of Telecommunications-Computer Applications of the NAS National Research Council, featured several speakers who discussed the technology and policy issues related to these systems.

Addressing regulatory issues raised by Teletext and Videotext, Bartlett predicted the Federal Communications Commission (FCC) will be the government agency with the greatest impact on the systems' development.

### Problem of Definition

The biggest problem in resolving the regulatory issues will be one of definition, he explained, since there is a tendency in Washington to "pigeonhole" new services in existing regulatory categories. It would be appropriate for the FCC to consider how [the systems] will be accommodated before they are marketed, Bartlett remarked.

Essentially, the FCC will have to relax some regulatory restrictions to accommodate Teletext and Videotext offerings, he said. The systems currently are permitted to be sent over telephone and cable television lines but not via television broadcast.

However, there are a lot of unused broadcast bandwidths, he pointed out, and there is no reason why some cannot be allocated to these new systems.

According to Bartlett, the FCC will also have to allow point-to-point communications in the systems, so electronic mail — an essential Teletext and Videotext service — can be offered.

### Need for Electronic Mail

"We need a sound electronic mail system," he noted, a system that will make possible the transmission of messages "from home terminal to home terminal." Who will supply the services and what services will be supplied are primary questions the FCC must answer, Bartlett said.

Communications common carriers, under existing FCC regulations, may not offer Teletext services because such systems are essentially data bases and thus constitute DP services, which telephone companies cannot offer. Several symposium participants pointed out, however, that some telephone companies already offer computerized data base services, such as weather information and dial-a-joke.

Bartlett suggested that the FCC approach the subject as it did in its first Computer Inquiry, before the services are ready to be marketed and before a real regulatory problem has arisen.

Deciding on the separation of DP and communications services as early as the commission did was "one of the better examples of the FCC carrying out its regulatory function," he said.

To illustrate how complex the legal and regulatory issues surrounding these new systems are, Bartlett noted that Teletext and Videotext will offer newspaper services. What happens, he asked, when televised data bases "become newspapers?"

For example, television broadcasters are subject to a number of statutory provisions on obscenity and "equal time" allocation that do not apply to newspapers. In addition, newspapers generally enjoy greater protection under the first amendment than do television broadcasters.

This demonstrates, he stressed, the necessity of deciding in what category to put these new data base services.

"These data base services can develop on a competitive basis," he said, hopefully with as little regulation as possible.

---

# Future Place in U.S. Market Seen For Teletext, Videotext Systems

WASHINGTON, D.C. — Teletext and Videotext data base retrieval systems are complementary, not competitive services, and both will find a place in the U.S. market, participants at a symposium held here recently predicted.

The systems are substantially different, according to Al Curll of the Semiconductor Research Department at Texas Instruments, Inc.

Videotext, sent via television broadcast, can offer only a limited amount of information because the types of services offered — news, shop-at-home, bank-at-home, and so forth — must be constantly updated, he explained.

Teletext, on the other hand, is accessed by telephone and can offer access to a "potentially infinite" number of data bases, Curll said.

The big difference between the two, he noted, is that millions of people can receive a single television broadcast, but the number of people who can use a telephone-based service is limited by the telephone system's capacity.

### 'Chicken and Egg' Problem

As to the potential U.S. market for the two types of systems, Curll said there is a "chicken and egg" problem. Development could be lengthy because the systems will be produced and offered by private companies, not the government, as in France and the UK.

Companies will be hesitant to offer services if consumers do not have the equipment to make use of them. At the same time, he continued, consumers will not be eager to spend money on hardware if the services are not being offered in sufficient numbers.

Curll added that the systems must be "granny proof" — capable of being used by all members of the family.

The development of color television encountered the same problem, he noted, and the industry took 10 years to reach maturity.

However, Edgar J. Gladstone, director of Quantum Science Corp., predicted that, assuming the data base retrieval systems are initially offered by cable television and can be available by 1980, cable television customers will use the systems by 1985.

### Electronics in the Home

Gladstone said a consumer entertainment and information systems study being conducted by Quantum Science Corp. has found an increasing market for sophisticated electronics in the home.

By 1985, he pointed out, the average education level in the U.S. will be considerably higher than today which will add impetus to home use of systems such as teletext and videotext.

People will be more consumer-oriented, he predicted, and interested in more convenient, more energy-efficient ways of shopping, banking and obtaining information.

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## International News

# Honeywell, Yugoslav Firm Plan Joint Venture

MINNEAPOLIS — Honeywell, Inc. is in the process of developing a joint venture with a Yugoslavian firm, Elektronska Industrija (EI), for the manufacture of Honeywell's Level 6 minicomputers and some of Honeywell's serial printers and CRT terminals.

Although already approved by Honeywell's board of directors, the venture still requires approvals from the Yugoslavian government and the workers employed by EI, a company spokesman said.

Honeywell declined to comment on a French wire service article from Agence France-Presse that reported that the company would share an $8 million R&D expense with EI.

If the agreement is finalized, Honeywell will hold a 30% interest in the venture, EI-Honeywell Informacioni Sistemi, with the Yugoslavian firm, an electronic and electrical goods manufacturer, having a 63% interest. The remaining 7% would be controlled by Progres, Honeywell's trading agent in Yugoslavia, the spokesman said.

HIS Italia, Honeywell's subsidiary in Italy, which has been responsible for the company's marketing efforts in Yugoslavia, would become the liaison for the joint venture.

The venture must be approved by both the provincial and national governments of Yugoslavia as well as by the 200 workers at EI who would be affected by the project, the spokesman explained.

A five-person business board, consisting of representatives from each of the participating firms, will control the marketing activities of the venture. "There has been no decision on whether the goods will be manufactured for Yugoslavian consumption or for export," the spokesman said.

Although the venture does not require approval from the U.S. Department of Commerce, EI-Honeywell Informacioni Sistemi may not export its products to Communist countries or Rhodesia, a Commerce Department official said.

Because Honeywell has a substantial installed base in Yugoslavia and has had past trading arrangements with that country, the spokesman said Honeywell views the joint venture as an attractive means of expanding its computer business.

When asked to comment on the report that Honeywell will split an $8 million R&D expense with EI, the spokesman said, "The joint venture is a manufacturing concern, not an R&D investment. We do not have any comment on the dollar amount of the investment or the wire story," which prompted speculation on the investment.

# *Brazilian Commission Oversees DP Imports*

RIO DE JANEIRO, Brazil — This country's Commission for the Coordination of Electronic Data Processing (Capre) has responsibility for controlling the importation of all DP equipment as well as examining user plans to determine whether their requests to upgrade their systems with imported equipment is necessary.

It is the government's general belief here that most users upgrade automatically with little planning and analysis of their decisions.

Capre cannot "explicitly" control computer manufacturing here but it can control it "implicitly," since it is responsible for setting priorities for importing parts, according to Mario Dias Ripper. Ripper is technical director of Serpro, the federal government service bureau and software company which employs some 15,000 programmers, systems analysts and designers. Ripper is also Serpro's representative on the Capre board.

Capre's authority is reinforced by the National Council for External Commerce (Cacex) which issues import licenses. Without prior approval from Capre, Cacex simply does not award such a license. Capre was organized in 1972 to serve the functions provided in the U.S. by the General Services Administration's Automatic Data and Telecommunications Service.

The organization is made up of representatives of the armed forces as well as the ministries of communications, education, treasury, industry and commerce and other groups.

Through these policies imports are kept within a yearly dollar quota without placing undue restrictions on any individual user organization. Capre is also responsible for helping develop local talent in the area of systems design, engineering and computer operations.

# Brazil Taking Bold Action To Hatch Mini Industry

*(Continued from Page 67)*

can meet the stringent government requirements, according to Marques.

Non-Brazilian companies applying for approval to manufacture here are asked to meet five criteria:

- Disclose their technology in a way that facilitates absorption of that know-how by Brazilian engineers and system designers.
- Demonstrate that within five years, products could be manufactured entirely here without importing any assemblies or ideas.
- Establish a joint venture with a Brazilian company.
- Produce systems primarily for the domestic market and secondarily for export.
- Control import of components.

This policy was announced in a formal resolution in July 1976, but most vendors here did not believe the government was serious about this plan. The real test occurred the following October at the National Data Processing Congress when IBM announced the System/32 would be manufactured in Brazil along with the 370/148.

IBM did not meet the criteria set by the government and was ultimately denied approval for this venture. IBM was denied approval primarily because of its own internal policies; the company is not known for its joint ventures or for sharing technology in countries in which it operates.

The policy on Brazilian computer manufacture and importation was reiterated in January 1977 when the government announced more stringent requirements including:

- Meeting a higher national index on goods produced.
- Showing that finished goods also had export potential.
- Providing total technological disclosures to the joint venture partners.
- Assuring controlling stock is in the hands of Brazil residents.

Companies that bid for rights to manufacture minis without Brazilian partners were rejected immediately. These included Burroughs Corp., Hewlett-Packard Co., IBM, Olivetti Corp. and TRW Corp., sources said. Unsuccessful joint bidders included CII Honeywell Bull, Inc., Philips Gloeilampenfabrieken, Nippon Electric Co. and Four-Phase Systems.

The outcome of this policy was seen on the exhibit floor here recently, and those companies which met the requirements are now beginning to ship systems. The activity at their booths showed a great deal of interest.

The market potential for minicomputers is sizable here even though cheap labor has kept the incentive to automate considerably lower than in the more developed countries. The installed base of all computers here grew from about 840 systems in 1972 to 5,963 systems in 1977, according to figures from International Data Corp.

The Brazilian government is planning to launch a similar plan to develop local capability in medium-scale systems. Still, the overall policy will do little to affect the operations of vendors importing large systems for sale here or manufacturing them locally without a Brazilian partner.

However, since importation of large systems will count against the overall national quota for imports, it can be expected that sales of such imported systems will flatten out in favor of locally produced minis and medium-scale systems when that effort is begun. As a result, users will be pushed toward distributed processing with domestic gear sooner than would have been their plan.

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# International News

## *Five 'Approved' Vendors at Show*

# Brazil Moving to Spur Domestic Mini Industry

**By Nancy French**
CW Staff

RIO DE JANEIRO, Brazil — The Brazilian Government's two-pronged action to establish a domestic minicomputer industry by excluding most minicomputer imports and authorizing five domestic manufacturers to provide systems is bearing fruit, judging from the equipment on display at the National Congress for Data Processing here last week.

Each of the five "approved" companies displayed its new offerings which are, in large measure, the outcome of joint ventures between Brazilian firms and foreign, non-U.S. manufacturers.

Today, users here who wish to acquire minicomputers may choose from the local brands, which range from small data entry systems to full-blown small business systems that run Cobol applications.

Cobra, a company formed as a joint venture between the government and private Brazilian capital, offers its Argus 700 process control system based on technology purchased from Ferranti, a firm from the UK that sold its first systems here to the Navy. Its business system is the Cobra 400, designed primarily for small business applications as well as data entry and data communications , networks, according to Cobra President Carlos Augusto Carvalho.

The system, which is based on Sycor 400 technology purchased from that U.S. firm, sells here for about $158,000. The price includes 20M bytes of fixed-head disk storage, eight CRTs and one printer. It can emulate Burroughs Corp. and IBM terminals and thus can be used as an interactive remote job entry terminal for IBM and Burroughs mainframes. It runs Cobol, TAL, an Assembler language, and LPM — an Algol-like language.

The TD200 is a data entry/-communications system with up to 32K of memory and two floppy disk drives. It can support a 600 line/min printer and magnetic tape unit. It is also programmed in LPM and costs about $15,000. The smaller TD100 supports only one floppy disk and is used only for data entry applications.

### Edisa's Line

Edisa, whose foreign partner is Fujitsu Ltd. of Japan, offers two minicomputer systems and one key-to-floppy-disk data entry system.

The smaller of the two minis, the ED 301, was described as similar in capacity to the IBM System/3 Model 8. However, because of more recently developed Fujitsu technology, the performance and design are significantly different, according to marketing director Fernando Vieira Guimaraes.

A typical 301 configuration includes 24K of memory, 16K of control storage in read-only memory, one removable 10M-byte disk, a 290 line/min printer and one or two CRT terminals. The package costs about $110,000.

The Edisa systems support both Cobol and Fortran applications. They feature virtual storage and functions that were described as comparable to IBM's DOS/VS operating system.

Although all equipment prices seemed high, vendors pointed out that buyers actually pay a bit less than they would for foreign imports when customs duties and shipping are included. Computers here cost users about 300% of the U.S. list price.

This year, about 52% of the Edisa products will be manufactured in Japan and 48% here. By the fifth year, 74% will be produced here.

Since most of the products are still being imported as kits and vendors are only doing final assembly and testing here, no savings have showed up in price lists yet.

Sistemas de Informacao Distribuida S.A., a joint venture between a small Brazilian conglomerate that makes televisions (among other things) and Logabax, a French minicomputer manufactuer, is offering a range of systems that feature large memory capacities but only operate on programs written in Logol — a "management-oriented language."

The processor as well as peripherals, except terminals, will be imported from France at first.

Systems range from 64K to 128K, and the largest is said to support as many as eight workstations. A typical workstation includes one terminal with a floppy disk and printer. These systems also offer users networking and multiprocessing, according to executive vice-president Guy de Manuel, with up to six independent tasks operating at once. Prices range from about $120,500 to about $350,000.

The firm expects to sell 40 to 50 systems by year end and around 300 in 1979.

Although networking is being offered by vendors here, its use is limited by the high cost, short support and low reliability of telephone service — problems common to most Latin American countries.

### Nixdorf Partner

Labo Electronica Ltd. (LABO), whose foreign partner is Nixdorf Computer AG of West Germany, is offering Nixdorf's 8870 line of systems.

A typical configuration for this vendor consists of a 64K-byte processor, one or two 10M-byte disk drives from Control Data Corp., one 150 char./sec serial printer and one CRT and is offered for about $92,000, according to the vendor.

The systems will be imported the first year and by the second half of 1979, Rudolph Oehling, president, expects to be assembling and testing here. The first parts of the system that will be manufactured here include cables and power supplies as well as cabinets, since the Brazilian partner is already one of the country's major furniture and cabinet makers.

The system runs on business Basic and Mumps, which recently gained standing as an Ansi standard language.

### Controversial Vendor

Sistemas e Computadores S.A. (Sisco), perhaps the most controversial firm here, is a wholly Brazilian-owned maker. Despite early troubles because of underfinancing, the firm has finally gotten government approval for two systems described as "emulators."

The newest — the MB-8000, which emulates Data General Corp.'s Nova 3, is available with up to 128K words and is priced significantly lower than competing systems.

The DE 5000, described as a Digital Equipment Corp. PDP-8 emulator, was developed about four years ago but the company was underfinanced and Jose C. Melo, the company's founder, had difficulty entering the market when it was unregulated and difficulty gaining government approval to manufacture the system when it became regulated.

However, about one year ago, a well-known industrialist, Henry Macksoud invested about $25 million in the firm, which gave him the title of president and gave the firm a solid foundation for the first time.

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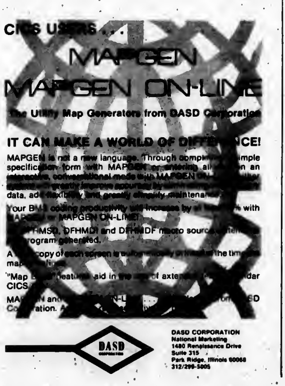
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# Fairchild Now Fifth Firm To Sue DG for Antitrust

*(Continued from Page 67)*

argued.

Digidyne's suit claimed that Edson DeCastro, president of DG, "stated to the president of Ampex Corp. that Digidyne used DG's trade secrets and proprietary information in connection with Digidyne's design and manufacture of its D.D. 120 computer." In addition, Digidyne charged that DeCastro and other DG employees "have made the same or similar representations to other customers of Digidyne."

These representations, Digidyne alleged, "were made with the full knowledge of the continuing contractual relationships and/or pending sales negotiations between Digidyne and its customers . . . and they were made with the intent to destroy, injure or otherwise interfere with the business of Digidyne."

Charging that its reputation has been damaged, Digidyne is seeking punitive and exemplary damages of $10 million from DG.

Digidyne claimed it did not use proprietary information to design and manufacture its D.D. 120 computer, the design of which, it contended, is totally unique to Digidyne.

As in the Fairchild suit, Digidyne argued that DG has violated the Sherman Act by refusing to sell its operating system software independently of its hardware. "The purpose of the said scheme is to stifle, if not completely eliminate, competition in the Nova-compatible market, thereby preserving DG's monopoly position."

Bytronix filed a suit against DG on Oct. 5, alleging that DG used copyright laws to violate antitrust laws.

"Anyone who makes an emulator for a DG processor," Byronix's attorney said, "is a violator, according to DG, of trade secrets." Bytronix entered the DG-compatible processor market about a year ago.

George Allig, vice-president and chief financial officer of Bytronix, recalled that on one occasion, a representative of DG told one of Bytronix's customers that the company was violating DG's trade secrets.

Bytronix's suit is not a countersuit against DG but a declaratory action designed to prevent DG from suing the company.

Rounding out the list of litigants against DG, Ampex Corp. is currently involved in three actions against DG, one of which is an antitrust action, a spokesman said.

SCI could not be reached for comment before press time.

DG declined to comment on the flurry of suits. "As a matter of policy, DG does not provide comments on lawsuits," a spokesman responded.

# High Court Denies Request By Racal-Milgo for Review

WASHINGTON, D.C. — The U.S. Supreme Court has turned down a request by Racal-Milgo, Inc. to review charges of antitrust activities in the modem market filed in a 1976 lawsuit against Western Electric Co., Inc.

The request, filed in August and denied last month, stemmed from a 1976 countersuit filed by Racal-Milgo in response to Western Electric's 1974 suit charging Racal-Milgo with patent infringement.

The 1974 suit claimed Racal-Milgo had violated 10 patents on a broad range of modem types. Racal-Milgo's countersuit alleged Western Electric's Dataphone 208 and 209 modems infringed on four of Milgo's patents.

Racal-Milgo also charged in its countersuit that Bell System's tariffs levied on the interconnection of customer-provided data modems violated antitrust laws.

Specifically, Racal-Milgo took issue with Western Electric's requirement that data modems be connected to the nationwide telecommunications network only through a Data Access Arrangement (DAA).

The U.S. district court in Florida, however, found Western Electric to be immune to antitrust laws on the ground that the Federal Communications Commission has exclusive jurisdiction over such issues.

Racal-Milgo appealed that ruling, but the appeal was dismissed as premature because other antitrust claims in the case were and are still pending.

A spokesman for Racal-Milgo's legal department said the company intends to try the issues now pending before the district court in Florida. When that decision is final, the company said it will go to the Fifth Circuit Court of Appeals and ask it to then decide on the DAA counterclaims.

Racal-Milgo will try to get the case heard before a jury, the spokesman said.

Western Electric declined to comment because of the other pending actions.

## Contracts

**Computer Sciences Corp. has been awarded a three-year contract valued at $7.2 million to provide computer-based services to the Naval Weapons Center in China Lake, Calif.**

United Scientific Corp. has received a contract from the U.S. Department of Commerce to provide the world's first commercial, superconducting Josephson junction voltage standard systems.

**The Computer Communications Group of Bell Canada has received a contract valued at $1.5 million annually from Societe d'Exploitation des Loteries et Courses du Quebec (Loto-Quebec) for the Loto 6/36 weekly numbers game.**

Cubic Corp.'s Defense Systems Division has been awarded a contract for $8 million to provide air-to-air combat pilot training system (Air Combat Maneuvering Range/Instrumentation). The system will be built and installed for the U.S. Air Force off the coast of the Philippines.

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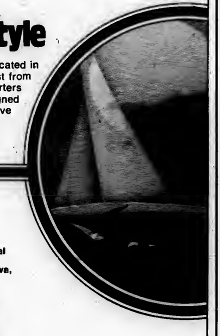

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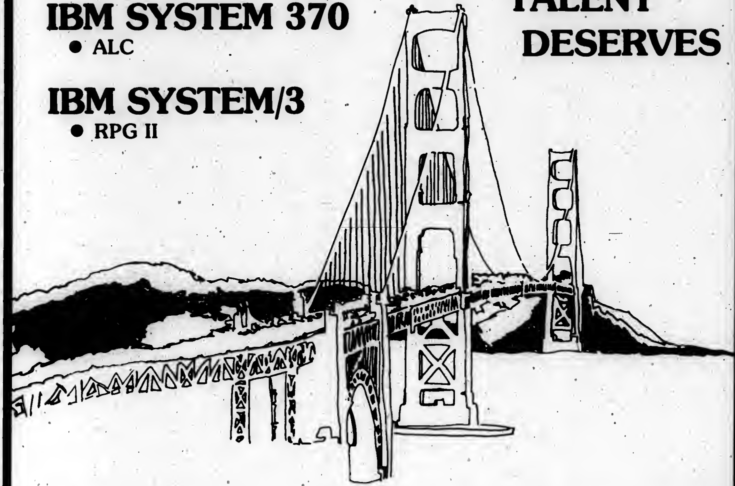

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This highly visible position demands data processing expertise complemented by a good overell grasp of the major business functions. The position will have total responsibility for corporate-wide administration of our CODASYL data bases. Specific responsibilities will include integrating manufacturing, marketing, finance and personnal data processing systems, setting standards for on-line system architecture, designing data base schemas and conducting technical system design reviews. To qualify, you should have 3-5 years experience in a manufacturing environment designing and implementing application software. Previous management experience and a working knowledge of large-scale data management systems are also important. MS in computer science or related field and an MBA also preferred.

## Systems Programmers/ Data Communication

If you're a top-notch systems programmer seeking greater challenge, this is your opportunity to be involved in one of the most complex and sophisticated areas of the operating system. Specifically, you'll architect corporate data communication strategies (including international applications) for Intel's Univac 1100/80. To qualify, you should have at least 4 years of experiance, including at least 1 year with Univac 1100 software, particularly Univac's CMS real time communications hardware. Degree in computer science or mathematics (or equivalent experience) preferred.

## Business/Applications Programmers

We have continuing intermediate and senior level opportunities in manufacturing, marketing, finance and parsonnel. If you have experience in any of these areas, we'd like to hear from you.

For immediate and confidential consideration,
please send your resume to Intel,
Attn: Keith Valk, Dept. 45AC
3065 Bowers Avenue
Santa Clara, CA 95051.

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intel

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# SR. SYSTEMS ANALYST

This corp. position located in W.N.Y. requires analyst with proven track record in design & implementation. Emphasis must be on both business & mfg. sys. applications. Strong communication skills necessary to fill this user oriented spot. $23,000. (Fee Paid) Contact P. Siegel.

**ROBERT HALF**
**PERSONNEL AGENCIES**
1310 Liberty Bank Bldg.
Buffalo, NY 14202
(716) 842-0801

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# DATA PROCESSING MANAGER

The City of Bloomington is seeking an innovative individual to manage a progressive data processing operation. Individual selected will interface with user departments, developing and implementing a wide variety of applications.

System currently consists of Burroughs 1700 with communications. Staff currently consists of eight persons and there are two planned additions.

Position requires a minimum of six years progressive professional programming and systems development experience and demonstrated management ability. Applicant should also have experience in data base management.

Interested, qualified applicants send resume, including salary progression and expectations to: Personnel Department, City of Bloomington, 2215 W. Old Shakopee Road, Bloomington, MN 55431.

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# At Incoterm, You'll See Your Work At Work

**In many computer companies, what you design or build goes inside some giant system in some giant company, never to be seen again. Not so at Incoterm. When you fly or where you bank, you may see our systems at work, making reservations, making change, making life easier for all of us.**

**Join Incoterm now, as we experience accelerated demand for our intelligent terminals and distributed processing systems, and you'll enjoy the full benefit of our expansion —in terms of growth...challenging involvement...and significant rewards. But most important, you'll have the satisfaction of knowing that your efforts go into real-world application. Come to Incoterm, a subsidiary of Honeywell, and make our systems yours.**

## SYSTEMS AND APPLICATIONS DEPARTMENT

A small, friendly, highly cohesive group, we're dedicated to creating sophisticated value-added software and to building accurate, advanced diagnostics for testing and rectifying new systems. Here you'll have first contact with our latest products in a professional environment where your individuality can thrive. If you seek extensive customer contact and state-of-the-art involvement, Systems and Applications will more than meet your needs.

### Applications Programmers

We need several individuals at most levels to participate in a wide variety of customer specific and standard software projects such as banking systems, data entry, airline reservations and similar real-time terminal applications. You will have the opportunity to work in diverse areas and to interface extensively with users' technical personnel.

Required are 3 years real-time assembly language and minicomputer experience. Exposure to communications, teleprocessing, remote batch, IBM 3270, Burroughs TD820, Uniscope 100/300, and/or VIP 7700 would be helpful.

### Diagnostics Programmers

In these mid- to senior-level positions, you will be responsible for the development of comprehensive diagnostic routines for a variety of processors, peripheral devices, and applications for our current product line and for new products. You will be the first to have programming contact with our latest advances, employing such software as off-line diagnostics, test operating systems, fault detection monitors, and special purpose test bed programming.

You should be equally comfortable in an electrical engineering, as well as a software development environment and be ready to apply both disciplines to this important function. A knowledge of assembly language and experience with LSI and semiconductor devices is required.

## ADVANCED SYSTEMS DEPARTMENT

Advanced Systems is responsible for developing software systems compatible with our new hardware products, including a new distributive data processing network-oriented terminal system. Involvement here satisfies the needs of professionals who demand the highest level of technical interface. In a genuine ground-floor environment, you can help to make significant architectural and product decisions in the following areas:

### Compiler Development

The ability to work and communicate with others and to contribute to a group effort is central to your success in this highly demanding compiler development position. You will need a BS or MS in computer science and at least 3 years experience in compiler development. Also required is one block structured language such as ALGOL, PL 1, PASCAL, C, or BLISS.

### Operating System Development

You will undertake responsibility for the design and implementation of operating subsystems, and contribute to the overall requirements definition of the operating system. You must be capable of implementing thorough knowledge of controlled file access, multi-level directory systems, and sequential, random, and index sequential access methods.

The successful candidate will have a Bachelor's degree in computer science and 3 years experience. You must have participated in the design and implementation of an operating system, and a working knowledge of data base systems and requirements is desirable.

### Leader, Operating System Development

Employing your strong technical knowledge and good managerial and leadership skills, you will undertake full responsibility for the design and implementation of the operating system. You must have at least 6 years experience including prior participation in the design and implementation of an operating system. A working knowledge of contemporary minicomputer-based operating systems is desirable.

### Verification

You will have responsibility for ensuring that a quality systems product is developed. Specifically, you will develop, construct, and execute test programs and participate in design, code, and specification reviews of new software products. In addition, you will help monitor the building of the system in order to rapidly identify schedule inaccuracies and conflicts.

Required are a strong technical background in systems software and at least 2 years experience in developing and/or testing systems software. Your most recent experience should be in the area of compilers or operating systems. A strong background in mathematics is desirable.

### Senior Technical Writer

We need a technical writer to produce internal and external system documentation using information obtained from formal design discussions and specifications. Additionally, you will help to establish documentation plans and identify documentation requirements as well as coordinating production of completed manuals.

You must have a strong technical background in systems software and at least 2 years experience in technical writing for a computer manufacturer or software vendor.

### Firmware Programmer

This individual will write firmware programs for new state-of-the-art microprocessors. You must be hardware and software savvy, super-competent, and intelligent. You must be a perfectionist who can spend hours squeezing a single line of code out of two hundred. You need not have experience in this area, only the certainty that you can handle this demanding position.

## ENGINEERING DEPARTMENT

Ours is a small, friendly department engaged in numerous highly challenging projects. If you want to work in an environment where you will be given design freedom and your contributions will be noticed, then Incoterm's Engineering Department is the place to work. We have several opportunities in the area of hardware development for qualified professionals who wish to engage in projects of maximum impact.

### Mechanical Design Engineers (All Levels)

Your responsibilities will include the design of CRT Terminals, Processors, sophisticated Automated Banking Equipment and special purpose terminals utilizing state-of-the-art electro-mechanical technology. Required are a BSME or equivalent with experience ranging from a desire to 10 years in computer oriented packaging. You will be exposed to design in plastics, castings & sheet metal, backplane interconnection techniques, and the design of paper handling devices/mechanisms.

### Product Support Engineers/ Mechanical

The successful candidate will provide design engineering support in the resolution of problems encountered by our manufacturing and customer service groups. Participation in design reviews, new product introduction, vendor surveys, and the continued maintenance of design integrity are key elements of the responsibilities of the positions.

Required are a BSME or equivalent with related experience in the commercial/military electronics industry. A thorough knowledge of electro-mechanical fabrication and assembly techniques is also required.

## PRODUCT DESIGN

### Drafting Personnel

Openings exist at all levels for electrical and electro-mechanical draftspeople. Your responsibilities will include layout for digitizing electrical schematics and logic diagrams, electro-mechanical design layouts, assembly, and detail drawings.

### Printed Circuit Designers

We need intermediate and senior level PC designers with experience in medium to high density state-of-art two sided boards. Multi-layer and automated design experience would be a plus.

### Product Safety Coordinator

We're looking for a confident, qualified individual to assume responsibility for submitting new products to Underwriters Laboratories and the Canadian Standards Associate for examination. You will also be responsible for subsequent listing and certification.

You must have outstanding written and verbal communication skills, firm attention to detail, and a systematic approach to the maintenance of records and related material. A fundamental understanding of basic electrical and mechanical engineering, as applied to commercial electro-mechanical devices, is also required.

## MARKETING

Our marketing efforts require the aid of a top marketing professional capable of producing solid, successful results in the following position:

### Product Support Specialist

We need an individual to provide technical software support to the director of systems integrator marketing for assigned prospects. You will be required to maintain a current and complete knowledge of all Incoterm product lines, both current and future, as well as knowledge of major competitors' products to assure a continuous competitive advantage.

**If you are interested in, and qualified for, any of the above positions, please forward your resume and salary history to Joe Dugan, Dept. C-1106, Incoterm Corporation, 65 Walnut Street, Wellesley Hills, Massachusetts 02181.**

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INCOTERM CORPORATION

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## Mini-Computer Programmer

PDP 11/45 7/32, 8/32 DG NOVA SEL 32/55, HP 3000, Honeywell Level 6 H 716. Two years exp. Req. Suburban Virginia & Md. locations. U.S. Citizenship req. $17-23K. Relocation Pd. Rush resume: Cybermetrics Corp., P.O. Box 579, McLean, VA 22101 Tel (703) 356-1997. Other positions avail USA & OS.

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Representatives wanted for all U.S. regions to sell public and university libraries. Superior system proven in actual library uses. We are represented in all national shows and promote, follow-up to develop qualified prospects for you. High commissions without investment. Call or write

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## PROGRAMMER/ANALYST DENVER, COLORADO

Professional position utilizing IBM 3033, OS/VS1 (converting to MVS), ADABAS, CICS, and an on-line program maintenance facility. Duties include analysis, design and programming of Admissions and Records systems. Bachelor's degree and minimum 6 months working experience with COBOL in an applications environment required. Familiarity with management information systems, on-line and integrated data base environments desirable. Starting by January 15, 1979. $15,000 to $16,500; excellent benefits: 20 days vacation per year, plus holidays, state retirement plan, etc. Send resume, letter of application, transcripts, and three letters of recommendation by December 1, 1978 to Director of Student Administrative Services, Metropolitan State College, 1006 11th Street, Denver, Colorado 80204, Attention Box 16. (303) 629-2956.

*An Equal Opportunity Employer*

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# ENGINEERS

# even if you're not looking

You're employed and you're reasonably satisfied with your current status. But if you're a professional with high aspirations and the talent to achieve, you manage to keep current with the job market. Just in case.

And keeping current means awareness of what's out there, spotting exceptional opportunities and exploring offers when you're not under the gun.

Which brings us to an exceptional opportunity.

Few industries today offer the career potential that's available in automatic test equipment. The LSI revolution, a shortage of technical talent, escalating field-repair costs all are focusing attention on automatic test equipment as one of the keys to the growth of the electronics industry over the next decade.

If that interests you, then Teradyne should interest you. Because Teradyne is the largest company specializing in automatic test. And the company with the broadest involvement in that field, with test systems for digital and linear integrated circuits, in-circuit and functional board-test systems, laser trimmers, backplane test systems, discrete semiconductor testers, and test systems for telephone lines.

Sales are currently running at a rate of over $80 million (quadruple the level of six years ago), and Teradyne is moving fast. Plant locations are in Boston, Massachusetts; Woodland Hills, California; and Northbrook, Illinois; and sales and service centers are located throughout the U.S., Europe, and Japan.

Our success in the test equipment field stems from our broad technology base, the contributions of creative professionals and the ability to sense what the customer needs even before the customer does. Our success in attracting and retaining the best people rests on what we offer: a tremendous amount of personal freedom, involvement in some very challenging projects and a share in the company's success.

So even if you're not looking, we'd still like to talk to you. Our particular interest is in professionals who are currently working in these disciplines:

## SOFTWARE ENGINEERING

- Direct control of real time analog and digital instrumentation
- Simulation of LSI digital logic components and boards
- Man-machine interface design

## ANALOG ENGINEERING

- Develop a thorough understanding of our customer's test requirements
- Design high performance reliable analog instrumentation
- Operational knowledge of digital design

It's smart to explore your options. Write or call collect: Vin Puglia, (617) 482-2700 for Boston opportunities or Jerry Cellner, (213) 993-1343 for Los Angeles opportunities.

And look to Teradyne . . . even if you're not looking.

**TERADYNE**

183 Essex Street
Boston,
Massachusetts 02111

20130 Plummer Street
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California 91311

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## SYSTEMS ANALYSTS & PROGRAMMER ANALYSTS

Vigorous and progressive Midwestern electric and gas public utility with over 11,000 employees has excellent opportunities for several Systems Analysts and Programmer Analysts with 1-3 years experience.

Our work includes application in energy planning, production and distribution, economic and financial planning, engineering and construction, billing and accounting, customer service, materials management, rates and regulation and personnel.

Your duties range through feasibility studies, design, implementation and maintenance utilizing both on-line and batch processes on IBM 158 AP and Amdahl central processors with large CICS network and TSO.

Experience more important than college degree; our training program is geared to individual needs.

Please send your resume to:

**PROFESSIONAL EMPLOYMENT - SA/PS**
**Consumers Power Company**
**1945 W. Parnall Road**
**Jackson, MI 49201**
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## ANALYST/ PROGRAMMER CONSULTANT

## APL

Opening in Richmond, Va. for experienced Analyst/ Programmer, working with our customers in analytic environment. Develop new systems; become involved with users.

Excellent salary and bonus. Fully paid benefits, including medical/dental insurance, profit sharing and tuition refund.

Send resume stating salary requirements to Recruitment Director, APL Time Sharing Division (C-1) of **THE COMPUTER COMPANY**, 1905 Westmoreland Street, Richmond, Va. 23230 Equal Opportunity Employer M/F.

THE COMPUTER COMPANY

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## MANAGER

### Software Development Department

Microdata, a world leader in the minicomputer industry has an outstanding opportunity for an expert in Minicomputer Software development. Lead a team of Software Engineers and Programmers in the development of our EXPRESS (TM) OEM system. This high visibility position reports to the Director of Software Engineering and requires at least 5 years related experience and extensive knowledge of minicomputers. An advanced Computer Science or Electrical Engineering degree is highly desirable.

Microdata is located in beautiful Orange County, California only 10 minutes from the beach and 50 minutes from the mountains. Enjoy living and working in an area typifying the best of the California lifestyle. In addition, Microdata offers excellent salaries and fringe benefits including company paid life, medical and dental insurance. For more information call P.A. Taylor at (714) 540-1113 or send resume to:

**Microdata**

**17481 Red Hill Ave.**

**Irvine, CA 92714**

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# Here's Your Chance To Manage or Implement Part of Digital's Special Systems Software Business

Computer Special Systems is an international organization dedicated to meeting the special needs of Digital customers. More than 900 people in locations throughout the world contribute to our efforts. As a widely experienced system organization, CSS provides a range of special solutions, from processor interfaces and handlers to multi-processors, complete turnkey systems, and more. We currently have several important positions for diversely talented computer professionals who seek management responsibilities and marketing rewards.

## Manager, CSS Software Engineering

### Maynard, Massachusetts

You will support the CSS product line manager by coordinating the worldwide CSS software development groups with each other and with Digital. Developing and coordinating information exchange regarding major projects, products, and development methods, you will act as advisor to all CSS business managers and product line manager on all matters involving software development, represent CSS in interfacing with other software development groups within the corporation and review and recommend budgeted operations for development functions. You will also provide strategy, standards, and procedures, special studies, and coordination and development of training programs.

Required are a BS in science or engineering or equivalent and 8-10 years managerial experience in a staff or line function with relevant responsibilities. An MBA would be highly desirable.

All the following positions are located in Santa Ana, California, and Nashua, New Hampshire.

## Managers, Systems Development

We need individuals to organize, plan, structure, utilize and manage resources to develop quality products, application software, and turnkey systems.

Responsible for active involvement in new product planning with a special emphasis on cross product line standards and compatibility, you will coordinate all products, establish, maintain, and manage operating procedures and policies, approve all project plans, and ensure that deliveries are as scheduled and budgeted. You will have all personnel, project development, and budgeting responsibility.

You must have had prior experience in a major product or project development, sound technical and managerial ability, and knowledge of the marketplace. Good communication skills, fiscal management capability, and a track record in project management and systems software are also required.

## Commercial Product Group

### Software Engineers

A wide variety of involvements await software engineers in the Commercial Products group. Your projects will focus on such direct customer applications as: data base management, data entry, transaction processing, general financial, general ledger, accounts payable and receivable, inventory, and payroll. We need talented individuals now to assume responsibility as senior programmer, systems analyst, lead programmer, technical leader, and commercial programmer; your position will be commensurate with your experience and abilities.

You must have 3-5 years experience and be familiar with DIBOL, COBOL, and ASSEMBLER languages. Also required is experience using RSTS/E, RSX-11M and/or CTX-300 operating systems.

## Commercial Firmware Engineering/ Data Communications Group

### Senior Software Engineers

We need development-oriented individuals to design, implement and test software for state-of-the-art communications projects. Required are 2-5 years of experience in developing software and/or microprogramming on Digital's or Intel 8080 modules. Experience with PDP-11 assemblers, data communication protocols or networks, and RSX operating systems would be highly desirable. Members of this group are key consultants to marketing and enjoy high visibility in the Commercial Product group.

## Technical Software Group

### Principal Software Engineers - Systems

You will assume project management/technical leadership of customer funded software turnkey projects, with responsibility for all phases of these projects: application, qualification, quotation and proposal, systems and design specifications, implementation, debugging, and installation. You will also be responsible for planning, budgets, and schedules.

A BS in EE, CS, or related field or equivalent is required and an MS would be a real plus. You must have a minimum of 5 years successful experience, including experience with the PDP family of computers and RSX operating systems. With primary emphasis on real-time data acquisition, process control, special interfaces, handlers, and drivers, you must be capable of programming in FORTRAN IV, MACRO, and BASIC. Also required are interpersonal skills for project management and analytical capabilities for debugging programs. You must be conversant with the latest software technology, such as structured design, HIPO, and PSUEDO codes, and walk through and review techniques.

## Product Development Group

### Diagnostics Software Engineers

Working closely with hardware engineers, you will design, implement, debug, test, document, and support diagnostic programs for CSS projects. You must be capable of handling sophisticated projects independently under limited supervision.

Required are a BSEE or equivalent hardware experience and experience in programming computer peripherals, including mass storage devices, in at least one of Digital's assembly languages, preferably MACRO-11.

*If you are interested in one of the above positions, please forward your resume with salary history to Henk Vezina, Digital Equipment Corporation, Dept. C1106, 3807, 55 Northeastern Boulevard, Nashua, New Hampshire 03060. We are an equal opportunity employer m/f.*

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### Computer/Programmar Analyst.

**QUALIFICATIONS:**

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**BENEFITS**

Salary $1196 - $1471 per month; 14-22 days vacation; District-paid medical, dental, vision care service for employee, spouse, & dependents. District-paid $30,000 term life insurance for employee;

**APPLICATION**

Letter of application and complete resume must be completed and sent to:

**John L. Rindone,**
**Director of Classified**
**and Adult School Personnel**
**Sweetwater Union**
**High School District**
**1130 Fifth Avenue**
**Chula Vista, Ca. 92010**

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## GROUND-FLOOR OPPORTUNITY

### Systems Programmer

We are going national with a leased, packaged software and hardware mini-computer system aimed at a selected field. Knowledge of business accounting methods and BASIC language a must. Familiarity with Olivetti P6060 helpful but not required. Successful applicant will be in charge of systems programming and modifications. Beginning salary based on qualifications. Ultimate participation extremely attractive. Submit resumes and salary history to Club Computer Services, Inc., 38 Willis Avenue, Mineola, N.Y., or call (516) 741-5586.

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## THE SOUTH IS RISING AGAIN for DATA PROCESSING PROFESSIONALS

Major corporations headquartered in the North are relocating to the Southeast at an alarming rate. These moves are inspired by a more healthful atmosphere for their employees and lower corporate and individual taxes.

Needs exist for state of the art EDP professionals from programmers through managers with salaries commensurate with experience and competitive with the North.

If your thoughts have ever encompassed a move out of the cold industrial North to the year round Carribean playground, now is the time to act. All fees and expenses for desired candidates are borne totally by the client corporations with no obligation to the individual. Our current and future openings include scientific and commercial background in virtually every type of hardware and software. To explore your move to the South, call us collect or submit your resume in confidence to:

**DSA DAVE STANEWICK & ASSOCIATES INC**

9300 S. Dadeland Blvd., Suite 508
Miami, FL 33156
(305) 666-5881

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The Navajo Tribal Government, located in rural northeast Arizona has immediate openings for experienced DP professionals: Systems & Program Mgr., Sr. Systems Analyst, Systems Analyst and Lead Programmer. Experience in Business systems and COBOL required? HP-3000 Data Base experience desireable. Salaries in the 20's. Send resume to Joanne Schmidt; Drawer 844; Window Rock, AZ. 86515.

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The EDP Specialist

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Specializing in career placement of EDP personnel of all disciplines. Our nationwide clients offer opportunities spanning the full spectrum of the Data Processing Field. Send resume, salary history and geographic preference to the attention of Adele Durham, Data Processing Division. All inquiries will receive immediate response.

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Earned terminal degree in an appropriate field, minimum of five years teaching, business, and/or administrative experience. Department offers baccalaureate programs in information systems and distributive education and associate programs in banking, information systems, real estate, retailing, and small business management. Submit vita, transcripts, and three letters of recommendation by December 1, 1978 to John C. Wassom, Chairperson, Search Committee, 431 Grise Hall. Salary dependent upon qualifications and experience. An Affirmative Action/Equal Opportunity Employer.

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## DATA BASE MANAGER

Function as Deputy Project manager, supervise staff of 15 in organizing, auditing, and documenting a very large social science data base. Interact with researchers on issues of sample weighting, derived variable construction, and data reliability.

Requires supervisory experience in data base management, skill in production-mode operations, some knowledge of statistical theory, and ability to write clear, concise technical reports. Prior project management experience preferred.

Salary $25,000 to $35,000.

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### Ph.D. COMPUTER SCIENTIST

Applications are invited for the position of manager of the computer science section of the biostatistics department. Responsibilities include guidance and supervision of programmers engaged in data base management on minicomputers and large multiprocessors, statistical computing, and computer graphics. The department is involved in a comprehensive program of consulting and collaboration with biomedical investigators; research and teaching. Position carries faculty appointment at Cornell University Graduate School of Medical Sciences.

Send resume and three letters of recommendation to Dr. Valerie Mike, Biostatistics Laboratory

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## B-6800 Analyst/Programmer

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Enjoy a challenging and rewarding position with a dynamic manufacturing organization in a highly desirable West Michigan resoort community. Send resume and salary history in strict confidence to:

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**western union data services**

## DATA COMMUNICATIONS

## HARDWARE & SOFTWARE ENGINEERS

Our continued growth at Western Union Data Services Company creates a variety of openings in state-of-the-art, microprocessor based systems and terminals.

These opportunities, located at our attractive northern New Jersey facilities in the foothills of the Ramapo Mountains, offer excellent career prospects and living facilities to enjoy.

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Requires experience managing complex technical projects, total Software Systems Design, minis/micros, R/T Systems using structured design techniques for DataCom & Terminal Products.

### SR. SOFTWARE PROJECT LEADERS

Lead Designer for total Software Systems Development. Solid communications based real time mini/micro processor systems experience required.

### SOFTWARE SYSTEMS DESIGNERS

Design, programming and testing of Assembly Language Programs using minis/micros. DataCom or Word Processing experience required.

### APPLICATIONS ENGINEERS

Requires experience in programming and logic design, micro based systems, Digital Communications Terminals, Customer Systems Applications.

### PRODUCT DESIGN ENGINEER

Experienced in Product Appearance Design, packaging, manufacturing processes, logo application, human factor engineering, mechanical linkage design.

### ENGINEERS

Experienced in Logic Analysis and Design, Communications Equipment, Peripheral Devices, Technical Documentation.

### JR. ENGINEER

Experienced in evaluation of DataCom Equipment and associated Peripheral Designs, hands-on Analog, Digital Hardware Design, know Sync/Async Datasets and Protocol procedures.

Salaries and benefits are competitive and commensurate with experience. Write or call Personnel, 800-631-7050. In N.J., (201) 529-1170.

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## Distributed Systems Architect: Distributed Computing is the Future!

At Digital, that comes as no surprise, because we've been promoting and developing distributed computing for a long time. As an innovator in the design and manufacture of distributed processing systems, we're currently recording significant new advancements in this field and we need a talented professional to augment our efforts in the area of distributed systems architect.

Defining and specifying interfaces and protocols in Digital network architecture, you will have the opportunity to define state-of-the-art concepts and work with advanced systems development to translate these concepts into competitive products. In this position reporting to the manager of DECnet architecture, you will also represent Digital in standards activities affecting distributed sysems.

We require a senior analyst with 6-8 years of total experience defining and implementing network software in some of the following areas: network architecture, network terminals, distributed systems standards, packet switching networks, protocol design, distributed algorithms, data base architecture.

*If you are interested in a position of the future, please call Dick MacDonough at (617) 493-9047, or write him at Digital Equipment Corporation, Dept. A1106 3807, 146 Main St., Maynard, Massachusetts 01754. We are an equal opportunity employer m/f.*

**digital**

# PROGRAMMER ANALYSTS

Have you considered the possibilities of an overseas assignment? For the right individuals, the opportunities for personal, professional and financial growth can be considerable.

Our Data Processing facility, located in Tehran, Iran, is among the largest in the Middle East. The hardware is Dual Honeywell 6060. The software is GCOS, COBOL, GRTS, GMAP and TSS. Applicants include Maintenance/Material Management and Personnel/Payroll as part of our Integrated Logistics Management Systems.

Experience on our systems is preferred, however we would be interested in evaluating your credentials if you have a strong background in the manufacturing environment.

Other openings include:

**SOFTWARE ANALYSTS** - Prior background in Honeywell software support. Requires thorough knowledge of GCOS, GMAP and GRTS.

**TELEPROCESSING SPECIALISTS** - Requires two years in teleprocessing activities utilizing H316-716 hardware with general knowledge of GCOS and working knowledge of TDS, GRTS, TSS and NPS.

**DATA BASE ANALYSTS** - Should possess one to three years experience in Data Base maintenance programming utilizing IDS. Applicants with strong experience in IMS or DMS may be considered.

In addition to paying your transportation and relocation expenses, Bell Helicopter will provide you with a highly competitive income and a generous benefits package which includes a housing supplement, travel and cost-of-living allowances, and overseas bonuses.

*FOR IMMEDIATE CONSIDERATION direct your correspondence in confidence to*

**Bell Helicopter International**
Department 172-KCW
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# NETWORKING/DATA COMMUNICATIONS

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The key professionals we're seeking for our expanding, and strongly software-oriented communications group will have had solid backgrounds in communications and/or systems software. More specifically, we require 3 or more years of experience in one of the following: Assembly Level Programming; Operating System Design; Communications Link Drivers (asynch, synch, SDLC); Front End Processor Software; Terminal Controller Software; Data Network Design.

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**P.O. Box 220**
**Walhalla, SC 29691**
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- IMS
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| OR Prog Anal - PDP 1170/34 Unix Fortran. | $20-23K |
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Located in west suburban Chicago, the Cooperative Computer Center (CCC) serves the administrative data processing needs of three Board of Governors institutions: Chicago State University, Governors State University and Northeastern Illinois University. Resources include a staff of 60, production software developed by SCT Corp. and an ITEL AS/4 computer supporting several RJE stations in an OS/VSI environment.

Reporting to a council of the three university presidents, chaired by the governing board's Executive Director, the CCC Executive Director is responsible for optimizing the performance of present resources, developing long-range ADP plans, preparing operating budgets, recruiting staff, allocating resources, project management, and ensuring that the universities receive timely and accurate management information.

Minimum academic qualification is a bachelors degree; an advanced degree in Computer Science or a related field is preferred. In addition, candidates should possess significant technical and administrative experience related to the management of an administrative computer center. Such experience should include a successful record of planning, budgeting, policy development, coordination and technical leadership for cost-effective university information systems. Candidates must be able to establish effective working relationships both with senior executives and technical personnel, and be sensitive to the varying information needs and political considerations within a university cooperative.

Starting annual salary is highly competitive with executive salaries in higher education and is negotiable, depending upon experience. Applications must be received by November 17, 1978.

Send resume, references and salary history to:
Dr. Donald E. Walters
Chairman, CCC Director Search Committee
c/o IEC
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## SYSTEMS MANAGERS

**$35,000 to $48,000**

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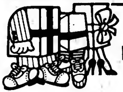

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## $18,077 - 20,437 YR.

Duties include the definition, design, testing and implementation of a data base management system. Position requires 3 years systems analysis experience, with 2 years involving data base management. IBM DOS/VS, ADABAS and CICS experience preferred. Polygraph and background investigation required for successful candidate. Send resume to:

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**P.O. Box 6638**
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Mr. Bob Brookhouse, Manager
Business Placement
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Rochester, NY 14650

All resumes will be acknowledged.

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TOYOTA

The nation's number one automobile importer has immediate openings for Data Processing professionals. Hardware/software environment includes the following: IBM 370/158 AP, IBM 3033 in January 1979, MVS, VTAM, TSO, and IMS.

# PROGRAMMER ANALYSTS

All levels of experience with COBOL, IMS, TSO and structured design. Bachelor's degree or equivalent required with written and oral communication abilities. Projects include vehicle and parts supply and distribution application and technical support.

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Minimum of 2 years experience with IMS/VS data communications systems. DC systems planning and implementation, application design and development support. Knowledge of external IMS architecture, on-line processing, MFS and user interface essential.

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Programmers

# Systems Programmers

## *We're thinking about the 1980's right now.*

Pacific Telephone has always been an innovator. Presently, we are engaged in a systems conversion project which will streamline our efforts toward the most advanced and efficient service for our users throughout the 1980's.

As part of that effort, we seek creative Systems Programmer Analysts who enjoy operating at the forefront of technology. You will be working in San Francisco providing centralized system support for the new Amdahl 470/v7's, 168 MP's, and 158 MP's located in our four remote sites. These systems will be running batch, TSO, three major CICS applications, wideband data communications, and NJE. Positions are open in:

- *MVS Support - responsible for system generation, installation, maintenance and troubleshooting.
- *VSAM Support - responsible for file design support, performance optimization, recovery utilities, and troubleshooting.
- *CICS Support - responsible for CICS application design support, performance optimization, recovery techniques, and troubleshooting.

Two years of appropriate experience is required.

Each of these positions offers high visibility in a dynamic environment. Your oral and written communication skills must be excellent; your talent, obvious. In return, we offer an outstanding salary and benefits program. Relocation assistance is available.

If you are an individual whose professional goals include working with state-of-the-art technology in an atmosphere where your own ideas and innovations are respected and encouraged, then we invite you to call COLLECT weekdays to Pat Baker at (415) 542-7474, or send your resumé to Dept. CW-10, Room 152, 370 Third Street, San Francisco, CA 94107.

**Pacific Telephone**

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# A NATIONWIDE CAREER SERVICE FOR COMPUTER PROFESSIONALS

**Programmer analysts, project leaders, systems programmers, IBM, Honeywell and minis. Salaries to $40,000.**

No fees or contracts. Our client companies pay all expenses. Career consultation prior to any action. Over 1000 EDP positions represented nationwide.

**Send your current resume** (or an old one with pencil update) together with salary history and geographic preference in complete confidence to our suburban Philadelphia headquarters . . . or phone:

**Systems Personnel, Inc.**
Suite D-26
207 Fox Lane
Wallingford, PA 19086
215-565-2920

**Systems Personnel Inc.**

A NATIONWIDE CAREER SERVICE

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Data Processing Manager, Data Processing Division, City of Albuquerque. The Data Processing Manager is responsible for managing the central data processing facilities of the City of Albuquerque. The Manager reports to and is administratively responsible to the Director of the Department of Finance and Management. The Manager will have functional relationship with representative of "user agencies", almost exclusively other City units.

City functions dependent upon data processing include: finance, personnel, water utility, police, municipal court, library, as well as other city departments. A strategy statement has been adopted which recognizes the importance of the central data processing division to provide information services for city operations. The division has: a staff of 50 employees of which approximately 1/2 are professionals, and operating budget of $1.4 million. Funding is available for a significant hardware expansion.

Candidates should have a Bachelors Degree in a related field with ten years professional data processing experience. Five years must have been as a senior manager in a comparable organization. Must have outstanding management and human relation skills.

Recent experience should reflect large scale IBM systems, familiarity of the System 360/50 model upwards, and a working knowledge of OS/VS operating systems with telecommunications capabilities. Evidence of recent technical updating through short courses or workshops is essential.

Such courses may include telecommunications, EDP management, project planning, word processing, vendor negotiations, minicomputers, and distributed processing. Salary $25,064-$33,842. We are an Equal Opportunity/Affirmative Action Employer./TO APPLY, SEND RESUME TO:

City of Albuquerque
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Albuquerque, NM 87103
ATTN: Vern Barela

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CSC

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Computer Sciences Corporation, as the leader in the information sciences industry with over 10,000 employees, can give you the career options you've been seeking.

CSC Applied Technology Division, as one of the fastest growing divisions of CSC, provides a full range of information systems technology programs to government agencies and offers you every opportunity to develop your professional skills and to meet both personal and professional challenges on one of our support projects. Opportunities include:

### HUNTSVILLE, ALABAMA

Business and scientific application programmers; systems programmers

### HOUSTON, TEXAS

Programmer/analysts and systems analysts with U1100 experience; data base management specialists

### KANSAS CITY, MISSOURI

Programmer/analysts with IBM 360/370, Honeywell 6000, COBOL, Conversion or Autocoder experience

### BAY ST. LOUIS, MISSOURI

Scientic programmers

### GREENBELT, MARYLAND

Scientific programmers with U1100 or IBM 360/370 experience; Systems programmers with IBM 360/370; data base management systems

### SAN DIEGO, CALIFORNIA

Scientific programmer/analysts with Fortran; systems analysts for a variety of command and control applications

### RIDGECREST, CALIFORNIA

Systems programmers with U100 EXEC experience, business and scientific applications programming

### WALLOPS ISLAND, VIRGINIA

Scientific programmers

### WASHINGTON, D.C.

Programmer/analysts with COBOL experience on the H6000 or U1100 systems

### RALEIGH/DURHAM, NORTH CAROLINA

Programmer/analysts with COBOL and Fortran experience on the U1100 systems

For immediate consideration, please send resume in confidence to:

Gus Siekierke
Director, Industrial Relations

**COMPUTER SCIENCES CORPORATION**

Applied Technology Division
6565 Arlington Boulevard
Falls Church, Virginia 22046
Major Offices and Facilities Throughout The World
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# DATA PROCESSING OPPORTUNITIES LEAD THE WAY IN OUR PROGRESSIVE SERVICE ORGANIZATION

We are a growing division of Automatic Data Processing Inc., and a supplier of on-line and batch brokerage services in the Downtown New York area. Our environment consists of two IBM 370/158's and an Amdahl V6 running under MVS/JES 2, distributed data processing and a data communications network nationwide of on-line applications. This means Challenging Opportunities, Recognition and Rewards.

### SYSTEMS PROGRAMMERS

- 1-3 years MVS installation and maintenance experience.
- BAL programming knowledge required.

### MANAGER OF DATA COMMUNICATIONS SUPPORT STAFF

- To manage technical support staff of three.
- Responsible for designing all future data communications networks.
- Evaluate, select and recommend data communications equipment.
- Support Data Communications Tech Center.
- Thorough knowledge of both ASYNC and BYSYNC protocol required.

### DIRECTOR COMPUTER OPERATIONS

- Direct, manage and control complete data processing operations for the 12 MIDNIGHT to 8AM SHIFT.
- 8-10 years experience in data processing management and operations.

Work for a company that has, and requires, good people — work for ADP!

Send detailed resume with salary history and requirements, indicating position desired, in confidence to:

**Ms. Elaine Miller, Personnel Department**

**ADP Automatic Data Processing**
Financial Data Services
New York, N.Y. 10004
*An equal opportunity employer m/f*

# The Sound of Music.

To us ... and to D.P. Professionals ... it's the sound of people placed in data processing positions that make sense. Mean growth. Just plain satisfy. Our D.P. placement specialists do precisely that. If you've never dealt with a true D.P. placement professional, isn't it time you did? Call or write the appropriate Jarvis Walker Group. Ask for a confidential interview.

N.Y. – 535 5th Ave New York 10017 (212) 867-2650
N.J. – 349 E Northfield Rd Livingston 07039 (201) 994 3773
Calif. – 11222 S La Cienega Blvd Inglewood 90304 (213) 670-7353

**the jarvis walker group**

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### SENIOR SYSTEMS PROGRAMMER
### SYRACUSE UNIVERSITY
**Administrative Data Processing**

We are looking for a Senior Systems Programmer to provide operating system support for a 2 megabyte S/370 148 computer running OS/VS1. The department utilizes the 148 to support administrative application systems for the University including a major online Student Records System running under CICS.

Applicants for this position should have two or more years systems programming experience in an IBM OS or OS/VS operating system environment. Heavy BAL experience and ability to debug operating system dumps is desirable. Familiarity with VSAM and DB/DC software is a plus. Responsibilities will include the generation, maintenance, enhancement and preliminary problem determination of systems software and installed software packages.

In addition to a superior technical environment and challenge, we can offer an excellent opportunity for professional growth and starting salary ranging to $20k + depending on experience and ability. We also offer excellent fringe benefits that include liberal tuition assistance and four weeks paid vacation. Please submit your resume including salary history in complete confidence by November 22, 1978 to:

**SYRACUSE UNIVERSITY**
**Personnel Office**
**Skytop Office Building**
**Syracuse, New York 13210**
*Syracuse University is an EO/AA Employer*

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# CORPORATE STAFF SYSTEMS PROGRAMMER

Harris, a Fortune 500 Corporation, has established a new facility in Melbourne, Florida for corporate MIS operations. This provides an outstanding opportunity for career growth and recognition for creative, proven, results oriented professionals.

SYSTEMS PROGRAMMER experienced Systems Programmer on large scale IBM system to assist in the planning and conversion from MVT to MVS. Degree and 2 years experience with MVS and JES2 or JES3 internals with prior MVT experience required.

Please send resume with salary history in confidence to: R.W. Underhill, HARRIS CORPORATION, P.O. Box 430, Melbourne, Florida 32907.

**HARRIS**
COMMUNICATIONS AND INFORMATION HANDLING
An Equal Opportunity Employer—Male and Female

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# PROGRAMMER

## PDP-11 REAL TIME

**1 + year's experience with RSX-11M at systems level.**
**3 + year's experience with MACRO-11 and FORTRAN**

Responsibilities include executive modifications and maintenance, device driver writing, real time and database applications. Ability to work closely with hardware engineers.

Salry commensurate with ability and experience. Excellent fringe benefits package. Pleasant location in Philadelphia suburb.

*Send resume in confidence to:*

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### MANAGER SYSTEMS & PROGRAMMING

3+ years management experience in manufacturing environment, Project Life Cycle. Must have some programming in background. Manage 4 prog/analysts with design & user interface responsibilities. Hardware is Honeywell 6440. Excellent opportunity. Call Marty Amato.
$27,000 FEE PAID

**ROBERT HALF**
**OF NEW YORK, INC.**
522 Fifth Avenue
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212-221-6500

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### PROGRAMMERS & ANALYSTS
**Junior to**
**Management Levels**
**Salaries to Mid $30s**

We have been retained by a worldwide prestigious firm to fill several immediate openings in the Washington, D.C. area. These positions offer challenging, creative work in scientific & business applications plus the security, salary & advancement of working for one of the best!

Take the time to contact us to advance your professional career. Call Pat Vaszko or submit resume along with salary requirement to:

Krautler Pers. Recruitment
8701 Georgia Ave.
Silver Spring, Md. 20910
Call (301) 585-5010

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### CORNELL UNIVERSITY
**Data Communications Mgr.**

The Systems Group at Cornell's computing center has an opening for a Technical manager with responsibility for data communications and small-computer support. Background in Data Communications, Electronics, Systems Programming, Mini- or Micro-computer programming or in related areas will be valuable. Administrative and supervisory capabilities will be strongly considered.

Cornell University is located in Ithaca, a small city in the Finger Lakes area of central New York. Ithaca offers excellent and diverse recreational facilities, freedom from urban problems of smog and overcrowding, and a stimulating intellectual environment. Cornell's benefit package is excellent, and a competitive salary will be offered. Call or send a resume to Richard Cogger, Computer Services, Langmuir Lab, Cornell Research Park, Ithaca, NY 14850. (607) 258-7588 Cornell is an Equal Opportunity Employer.

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### PROG ANAL

Expansion creates growth opty for indvl with mfg or fin'l appl exp. Syst 3 RPG II req. Salary to low 20's + bonus.

### SYST ANAL

Cobol exp from any IBM 360/370 shop. Salary to 22K

Many other Prog, Prog Anal, Syst Anal and mgmt positions avail for EDP pros seeking upward move and challenge. All fees/exp paid by client cos. Reply in strict confidence.

**SHS INTERN'L**
1401 Cedar Crest Blvd.
Allentown, PA 18104
K. Molnar (215) 437-5551

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# POSITIONS NATIONWIDE
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**SYS PROGS ........To 30K**
Many openings with top firms, IBM, CDC & Honeywell.

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**COBOL PROGS .....To 24K**
Terrific opportunities available nationwide.

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# Aircraft Sales Representative

Like to sell aircraft 365 days a year? Come to the Sunny Southwest. Proven sales record essential. General aviation knowledge desirable.

Call or Write
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(915) 778-9315
6774 Convair Rd.
El Paso, TX 79925

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# BAL PROGRAMMER

**Ætna Life & Casualty** has immediate openings for BAL Programmers.

Applicants must have 1-3 years BAL Programming experience with a background of CMS & JCL usage and complex debugging techniques. MVS knowledge will be a plus as well as the ability to learn and understand the functions of a large, complex, on-line system. Good written and verbal communications skills and ability to work effectively with others are definite requirements.

Salary range $14,600 to $20,000. Send resume to
Mark Grove, Recruiting Office, Ætna Life & Casualty,
79 Farmington Avenue, Hartford, CT 06156.
An equal opportunity employer.
(No agencies please.)

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LIFE & CASUALTY

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# REGIONAL SALES MANAGER

## Southeast Asia

A challenging position is available within our organization for an experienced sales professional with a strong technical data communications background. You would be joining Racal-Milgo, Inc., internationally recognized leader in the data communications industry. The ability to work with diverse groups of people and make sound business decisions is necessary. Your involvement will include preparing sales forecasts, tender proposals in providing sales/marketing and technical assistance to our network of representatives and distributors. Regional travel will be required as necessary.

Compensation commensurate with the responsibilities and a complete benefits program accompanies the position. If you feel that you are ready to make a positive career move then call Rod Manning collect at (305) 592-8500, Monday through Friday, 9 a.m. to 4 p.m. If unable to call please submit your confidential resume to:

**Racal-Milgo** — the new name for ICC
8600 N W 41st St., Miami, FL 33166 (305) 592-8600

RACAL
Equal Opportunity Employer M/F

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# "LIFESTYLE"

Fit your lifestyle to the varied geographical settings within the Sunbelt. Our Fortune 500 clients seek qualified EDP professionals for varied challenging positions. REPRESENTATIVE Positions:

DALLAS: A major manufacturer, seeks Systems Analyst(s) to implement new systems, requires previous design and implementation experience, IMS/VS, ANS-COBOL. Salary $18K-$24K range.

PHOENIX: A major bank seeks experienced IMS/VS professionals positions range from Programmers to Project Manager. Salary Range $14-$27K.

LONG BEACH: Leader in Computer Services industries seeks Programmer, Programmer/Analyst(s); Systems Analysts(s); and all levels of Technical Support personnel for IBM 3033/370; IMV/VS environment. Salaries $12-$34K range.

These are only samples - companies in all "Sunbelt" states have placed similar requirements. The companies pay all fees including interviewing and relocation additionally they offer excellent benefits and in-house career progression.

Please send your resume in CONFIDENCE OR CALL ME TOLL FREE 1-800-821-2280 x 805 (in MO, 1-800-892-5890 x 805).

Bill Denny, Vice President

**Jim King and Associates**
438 Gulf Life Tower/Jacksonville, Florida 32207
(904) 398-7371

## MARKETING REPRESENTATIVE

If you are in the top 20% of your marketing organization, making $35,000 + and have background experience in the Office Products and/or Data Processing Industry, we would like to talk with you.

### OPPORTUNITY

DELTAK, the world's largest video publisher of Data Processing and Management Development Training programs, is looking for additional marketing representatives. Our growth rate has averaged around 60% annually, and now opens the doors for career advancement for top quality individuals. Historically, DELTAK has chosen to promote from within, which provides for further opportunities and advancement.

### ENJOYMENT

An opportunity to create - to help us continue the growth of an outstanding company, in an exciting new industry. The acceptance of television as a training tool by corporations has caused our industry to be one of the fastest growing, worldwide.

### SALES EXPERIENCE

You will be marketing DELTAK's products and services to the top executive from the Data Processing and Management Development industry. Previous Data Processing experience would be desirable. Our key prospects/customers are the top Fortune's 500 companies in North America. Typically, successful DELTAK marketing reps are those individuals who have mastered the art of selling, combined with excellent organizational skills and sound business acumen.

We require a minimum of three years demonstrated top sales performance with such companies as Xerox, IBM, or one of their competitors.

### DESIRE

The common denominator for success in our business, is a strong desire to work hard and be successful. Frequent 10-hour days are not uncommon among our sales force.

### COMMUNICATION SKILLS

Possession of excellent communication skills, both written and oral are also key attributes. Our marketing representatives are often referred to by the Industry as a group of "true professionals."

### RESPONSIBILITY

Our company is growing. We need individuals who seek to mold their future, and play a part in the fulfillment of our corporate objectives. If you feel you have the experience and desire, please write, enclosing resume, to:

Mr. Tom Geraghty
District Manager
1133 Ave. of the Americas Suite 230
N.Y. 10036
(212) 575-0285

**DELTAK**

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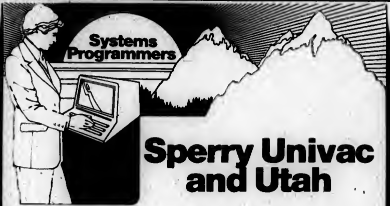

# Sperry Univac and Utah

# Where the Best of Both Worlds Come Together

**WHERE** we'll provide you the challenge of exploring the unexplored in meeting our communications and terminals need of today and in the future. WHERE you'll enjoy the excitement of a unique life style amid some of the most spectacular mountain scenery in the United States.

**WHERE** you can apply your analytical skills to the design, development, and implementation of systems software for data communications, networks, data entry, terminal handlers, and operating systems. Or participate in customer support of systems software for our communications and terminals products. Development will include formal design, documentation, coding and testing. BSCS or equivalent experience.

**WHERE** you will receive an excellent benefit package consisting of: Comprehensive medical and maternity; Life, dental and travel insurance programs; Retirement plan; Accident and sickness, sick leave and long-term disability (income, protection); Paid holidays and vacation; Educational reimbursement; Stock purchase plan; Company-sponsored training programs.

Call toll free: **1-800-453-4534** or, send resume complete with salary history to:

Employment Department
322 North 2200 West
Salt Lake City, Utah 84116

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SPERRY UNIVAC

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# Programmers & Analysts

**San Francisco Peninsula**

Our Business Systems Department needs responsible people to assist in the development of financial, engineering, manufacturing, product assurance, and material systems. These openings are in a data base environment and processing is being changes from batch to on-line.

Education requirements include a BS in Business, Mathematics, Computer Science or work experience equivalent.

**PROGRAMMERS** - one to three years' experience
**PROGRAMMER ANALS** - two to five years' experience

Salaries are commensurate with experience. Send resume with salary history/requirements to Professional Employment, Dept. BAR 72

Ford Aerospace & Communications Corporation

Western Development Laboratories Division
3939 Fabian Way, Palo Alto, California 94303

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## PHILADELPHIA

### SYSTEMS MANAGER TO $33,000

HEALTH INSURANCE SYS heavyweight to join PHILA area based NATL INSURANCE GIANT. Skillful ADMINISTRATOR w/superior MGMT SKILLS essential. Establish productive working atmosphere within growing dept. Lge scale IBM exp essential. Exp w/NATL HEALTH INSURANCE FIRM highly pfrd. Corp reorganization has created excel advancement potential.

We welcome company inquiries

This is a partial listing

For full details, please call for immediate interview appt or forward resume to our Recruitment Specialist, Wayne Robinson at,

**ROBERT HALF**
PERSONNEL AGENCIES, INC.

Philadelphia, Inc.
2 Penn Ctr., Ste. 706
Philadelphia, PA 19102
(215) 568-4580

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## IDAHO

Banking Applications Programmer Burroughs B-2600 COBOL environment

Position requires experience in bank applications programming on Burroughs medium systems. On-line systems experience highly desirable.

Geographical area offers wide range of outdoor recreation opportunities. Near Yellowstone and Grand Teton National Parks.

Forward resume and
salary history to
Banco, Inc.
1020 Lincoln Rd.
Idaho Falls, ID 83401

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## SR. SOFTWARE SPECIALIST

Pitney Bowes is a growth oriented leader in the design and manufacture of advanced business equipment and systems. We are currently seeking a technical support specialist with 2-3 years experience in UNIVAC 1100/22 and 1108 Systems; experience with EXEC-8, TIP, CMS, DMS, a definite plus.

Primary responsibilities include implementation and support of current levels of Operating Systems, Compilers, DBMS software, and Telecommunications software. Experience in technical programming and problem solving support for software intensive applications, especially DBMS and communications oriented systems is desirable.

If you are a career oriented individual with growth motivation, join Pitney Bowes, a progressive company where your accomplishments are recognized and rewarded. We are planning in the near future to upgrade our UNIVAC 1100/22 and 1108 to an 1100/82 System.

We offer an excellent salary and outstanding benefit package. For prompt consideration, please CALL COLLECT or forward your resume including salary history and requirements to:

**STEVEN DIAZ**
**Professional Recruiting Specialist**

**Pitney Bowes**
424 Washington Blvd.
Stamford, Conn. 06904
(203) 356-6560

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## strictly speaking - are you a decisionmaker?

If so, the special demands of our rapidly expanding computer design efforts requires your special talents... special people who thrive on innovative challenge... who want the chance to shape their own future... who are decisionmakers.

As a leading manufacturer and distributor of scientific lab instruments and distributor of office and laboratory equipment, we can offer uncommon, long range high visibility and growth potential and exposure in all levels of management. We are seeking the following career professionals

### SYSTEMS ANALYST

If you're a Systems Analyst with 3 years of systems applications and design experience who can assume project responsibility for designing of new and/or modifying existing systems, join our elite group of professionals. Generalized background in all business disciplines, a plus.

### APPLICATIONS ANALYST/PROGRAMMER

Working with user department managers, candidate will identify problems and recommend modification of existing systems as well as design new systems for resolution of various company needs. To achieve these goals you will be using your experience in project and applications design. Minimum qualifications include proficiency in COBOL and thorough knowledge of DOS/VS and 2 4 years experience in applications design. Experience with DL/I, BAL, CICS. DBOMP and VM/370 helpful.

*These positions offer the opportunity to develop new on-line capabilities using the latest hardware and software systems in the aggressive expansion of our 370/138 hardware. If you're a decisionmaker, expand your career horizon at Sargent-Welch! Forward resume reflecting experience and salary expectations to:*

Personnel Manager, (312) 677-0600

**SARGENT-WELCH**
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# SCIENTIFIC & SYSTEMS PROGRAMMERS

## Here's your opportunity to work with some of the most advanced computer facilities in the country

Two IBM 3033's interacting with over 250 remote terminals plus 40 mini computers serving specialized applications all help to to keep Pratt & Whitney Aircraft the leader in the jet engine field.

If you have 0–10 years in scientific and systems programming, and wish to broaden your experience, consider the opportunities in one of the following areas.

**SCIENTIFIC PROGRAMMER/ANALYSTS**

- Computer Aided Design Systems
- Engine Simulations
- Real Time Data Reduction
- Mini/Micro Applications

**SYSTEMS PROGRAMMERS**

- Real Time (BPM, CP6, NOS, EXEC 1100)
- Mini Computers (RSX-11M, RT-11, DOS, . . . )
- Time Sharing (VM/CMS)
- Batch/Transaction Processing (MVS/JES2/TSO)

A requirement is a B.S. degree in Computer Science, Mathematics, Engineering or related fields.

For immediate consideration, call 1-800-243-3342 toll free or send your resumé (including salary history) to Professional Recruitment, Office 124, Pratt & Whitney Aircraft Group, East Hartford, Conn. 06108.

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Commercial Products Division
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## FINL SYS CONSUL TO $37,000

FINL SYS expert from BIG 8 or BLUE CHIP firm will join mgmt team of foremost PHILA area SOFTWARE VENDOR. Skillful communicator must be capable of acting independently in a MKTG & SYS PLANNING SUPPORT capacity. Must be DEGREED, TECHNICALLY CURRENT w/extensive FINL SYS design & implementation exp. NO TRAVEL. Excel EXEC BENEFIT PKGE.

This is a partial listing

We welcome company inquiries

For full details, please call for immediate interview appt or forward resume to our Recruitment Specialist, Wayne Robinson at:

**ROBERT HALF**
PERSONNEL AGENCIES, INC.
Philadelphia, Inc.
2 Penn Center, Ste. 705
Philadelphia, PA. 19102
(215) 559-4590

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# HARDWARE SOFTWARE PLANNER

**$30,000-No. Carolina**

Our client, a leading EDP/Financial Service organization, due to continued growth, currently has oppty for EDP Planning professional. Resp will include all Hardware/Software evaluation & plng in relation to user needs. Client reqs person with strong "DOS" and "OS" software exp. in addition to latest state-of-art IBM hardware knowledge. Bkgd in mini-computers would be asset. Previous banking/insurance or financial industry exp is preferred. Excellent advancement, full career benefits. Client co pays all fees. For details contact J.K. Schwab at 704/375-0600 or send resume in complete conf to:

FOX-MORRIS
Personnel Consultants
1742 Southern National Center
Charlotte, NC 28202
EDP SPECIALISTS

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## SYSTEMS PROGRAMMER & PROGRAMMER ANALYST

Chloride, Inc. seeks a system programmer to be responsible for a DOS/VS, CICS/VS, VSAM System and to install a new IBM 3790/8100 Distributed Processing System using SDLC/VTAM.

We are also interviewing for an experienced programmer analyst to work in Inventory Control and General Accounting Applications. System design capabilities, CICS/VS and distributed processing skills are desirable. Excellent salary and fringe benefits. Send resume or call for confidential interview:

Chloride, Inc.
Personnel Dept.
P.O. Box 24598
Tampa, FL 33623
(813) 870-3770
EOE M/F

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$16,000 & up depending upon experience. · REQUIRED: 3-5 years COBOL. PREFER: ANSI COBOL, Burroughs B1700/1800, Burroughs UPL-MCS, Banking Experience.

Northern Indiana Financial Service Corporation (NIFSCO) provides D.P. services to banks. We have a country type living in a small midwest city, but with an opportunity to learn and a challenge to produce. Programming done on-line. Send resume, salary history, and references to:

STEPHEN TROYER
NIFSCO
PO Box 997
Marion, IN 46952
(317) 999-9921

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## SYSTEMS ANALYST/ PROGRAMMER

Knowledge NCR NEAT/3 CIF-FOCIS NCR 8570 Criterion Computer. Computer Science degree plus 3-5 years experience with NCR CIF & FOCIS. Develop and maintain systems and oversee programming staff of three. Excellent opportunity with banking institution. Outstanding benefits. Send resume to:

Personnel Office
P.O. Box 1912
Lexington, KY 40591
*Equal Opportunity Employer*

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# PROGRAMMERS

## Denver

Martin Marietta Data Systems offers superior opportunities in the systems programming area for individuals with a minimum of 3 years experience on CDC 6000 and Cyber Computers. Knowledge of CP and PP COMPASS assembly language a necessity. Positions involve systems support of a 6500 and Cyber 172 running the NOS/HE operating systems.

We also have opportunities for individuals with a teleprocessing Hardware/Software background. Knowledge of Assembly and Fortran languages a necessity. A knowledge of CDC, NOS/BE · MOD COMP, and INTERCOM desirable.

Martin Marietta provides excellent fringe benefits. Send your resume, including salary history, in confidence to: Marvin Crandall, Manager, Human Resources.

**MARTIN MARIETTA**

MARTIN MARIETTA DATA SYSTEMS
3900 South Wadsworth
Mail #D 4001
Lakewood, Colo. 80235
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# FLORIDA POWER CORPORATION

# FLORIDA WEST COAST

## (IBM SYSTEM 370 MODEL 158 - OS/VS2)

Immediate openings in business applications with career advancement opportunities. Beautiful Florida Suncoast, excellent benefits.

### SENIOR APPLICATIONS ANALYST

Minimum of seven years' experience in computer programming and five different applications required. Familiarity with computer modeling techniques desirable.

### APPLICATION PROGRAMMER ANALYSTS

Two to five years' experience in computer programming and three different applications required. COBOL, TSO, CICS and IBM-OS JCL. Lexicon desirable.

Submit resumes and salary requirements to

Florida Power Corporation
Box 14042
St. Petersburg, Florida 33713
EMPLOYMENT SUPERVISOR
MICHAEL S. REEDER

Florida Power CORPORATION

*AN EQUAL OPPORTUNITY EMPLOYER*

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# CADILLAC EDP OPPORTUNITIES

CADILLAC offers you assistance in finding a position that meets your objectives . . . NATIONWIDE or in your present locality. For 45 years CADILLAC has been helping professional people find new positions that offer greater growth, more responsibility, new experience, relocation, higher salary, etc . . . we'll make every effort to do the same for you. Just send your resume, or a note outlining your experience . ... no cost or obligation to you.

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|---|---|---|---|
| Sr Anal/Proj Mgrs | to $35 | Mgrs S/3 RPG-11 | to $27 |
| Systems Anal | to $27 | Scien/Mini Prog | to $24 |
| Prog/Analysts | to $25 | EDP Auditors | to $25 |
| Programmers | to $22 | System Prog/Tech Mgrs | to $32 |

## NATIONWIDE--FEE PAID--CONFIDENTIAL

For more information, contact or send resume to:
Mark Fuller

CADILLAC ASSOCIATES, INC.
32 W. Randolph St., Chicago, IL 60601

# Software Instructor

If you are an individual with applications programming (assembler) or real time systems experience on mini-to-medium computers, you have what we need. Knowledge of operating systems, computer hardware, communications and previous teaching experience is desirable. You will be involved in a wide variety of assignments which will focus primarily on the development and implementation of training courses for customer and in-house personnel in the areas of system generation and application programming techniques.

# Hardware Instructor

For this position you need an in-depth knowledge of electronics and digital circuitry. Some exposure to assembly language programming and operating systems would be an asset. A minimum of one year classroom experience required. You will be responsible for handling instructional programs for field service and distributor representatives. Subject matter will include system flow, digital circuitry and maintenance techniques as well as system applications.

As a leader in the field of sophisticated distributed on-line data processing systems, we offer competitive starting salaries, plus participation in our comprehensive company paid benefits program. You will be based at our Trumbull, Connecticut facility; one of the most up-to-date in the industry, with easy accessibility to New York and Boston.

Please send your resume with salary history and requirements, indicating position desired, in strictest confidence, to: Mr. Peter Soligon, Bunker Ramo, Information Systems Division, Trumbull Industrial Park, Trumbull, Connecticut 06609. We are an equal opportunity employer/male and female.

**BUNKER RAMO**

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# ENGINEERING PROGRAMMER

**Help Develop Innovative Aircraft Monitoring Systems With**

CONSYSE

Conrac Systems Software and Engineering

Apply your 3-5 or more years of experience with scientific languages (and exposure to top-down structure techniques) to sophisticated real time distributed microcomputer network projects. Ability to work with Engineering staff in formulating programs based on requirements is essential. You'll share CONRAC's impressive, consistent growth; enjoy excellent working conditions in an attractive suburban location, and the excitement of CONSYSE — Conrac System Software and Engineering. Please send resume with salary record data to: Ralph Holtermann.

**CONRAC**
**Systems-East Division**

CONRAC CORPORATION
32 FAIRFIELD PLACE
WEST CALDWELL
NEW JERSEY 07006

An Equal Opportunity Employer M/F

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# PROGRAMMER/ANALYST

Harris is a leading manufacturer of high capacity, offset printing presses for the publication and newspaper printing industry, and a division of a profitable, professionally managed corporation with an aggressive product development and diversification program.

New opportunities due to our rapid growth are presently available in data processing for programmer/analysts whose responsibilities will include applications in accounting, material requirement planning, order entry/billing, shop floor control and other areas. Your work will be primarily in new development in defining applications, designing and programming, and installing the applications with project leaders supervision.

Position requires a minimum of 3 years OS applications, with high proficiency in ANS and COBOL. Must have personally designed, programmed and installed a multi module medium to large scale OS application. Other helpful experience would include on-line transaction applications (CICS), interactive programming (VM/370), BOM, MRP, shop floor, costing, inventory, and structured designing and programming.

Competitive salary and comprehensive benefits are offered.

For confidential consideration please forward resume and salary requirements to: Harris Corporation, Web Press Division, Personnel Manager, Mechanic St., Pawcatuck CT 02891.

**HARRIS**
**COMMUNICATIONS AND INFORMATION HANDLING**

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The world's leading manufacturer of computer peripheral equipment has openings in our new Systems Division. We need experienced professional, innovative individuals who understand the need for discipline and standards in a complex development effort. The continual growth of our company and our products will provide a rare opportunity for your professional challenge and growth.

## HARDWARE DEVELOPMENT MANAGER

Experienced IBM/370 compatible peripheral equipment hardware design and development engineer with management and administrative skills to supervise the development of complex hardware products for the Systems Division from concept through manufacturing release. Will report to the Director of Systems Development. MS/BSEE/CS or equivalent degree with proven management background.

## HARDWARE ARCHITECT

You will have the opportunity to play a leading role in defining the hardware/software/firmware interface for a complex data storage subsystem. Requirements include MS/BSEE, CS degree or equivalent with digital logic hardware emphasis and 5 years experience in the design and implementation of multi-micro or multi-mini processor applications. Experience with hardware/software trade-off analysis and interface specification writing is also required.

## DIAGNOSTIC DEVELOPER

You will design and implement functional diagnostic software and validate the operation of hardware/firmware software during production and in the field.

Requirements include a working knowledge of digital computer hardware, proficiency in assembly and higher level programming languages and original thinking ability to find loopholes in apparently sound logical systems. Other requirements include several years in software diagnostics development for processors or complex systems and a MS/BSEE or CS degree or equivalent.

## DIAGNOSTIC MANAGER

You will be responsible for directing the activities of several software and firmware diagnostics developers and for product quality assurance within the development group. The position requires management experience over highly specialized professional employees in hardware, software or firmware development, demonstrated competence in diagnosing digital computer hardware and firmware faults and an MS/BSEE, CS degree or equivalent.

## OPERATING SYSTEMS DEVELOPER

You will be responsible for the design and development of high performance machine dependent software for the Systems' Division innovative hierarchical data storage and management system. Background requirements include an MS/BS in Computer Science or EE degree and 5 or more years of experience related to operating systems development on large computer peripheral equipment.

STC offers a liberal benefits package including a stock purchase plan and profit sharing. If you would like to investigate our professional challenges, phone 1-800-525-2940 Ext. 7403, or send your resume in complete confidence to:

**Dick Shinn**
**Professional Placement, Dept. CW/1106**

STORAGE TECHNOLOGY CORPORATION
2270 South 88th Street, Louisville, Colorado 80027

STC

We are an equal opportunity employer M/F

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## Pacific Northwest Technology Manager

The City of Seattle is seeking a creative computer professional for a challenging role in the City's central data processing organization. The City's multivendor computer center, with a budget in excess of $4,000,000, is dominated by a 2 MB Univac 90/80 running under VS/9 · one of the largest 90/80 installations in the U.S. Other hardware applications include minicomputers, RJE, interactive programming, COM, OCR and distributed processing. Software applications include utility billing, engineering, general government, law enforcement, geoprocessing and a wide range of business applications in both a batch and real-time environment.

As a member of the City's central data processing authority, the Technology Manager will supervise a staff of professionals responsible for customer support and the installation and maintenance of data communications, DBMS and operating system software.

The successful candidate will have 10 years experience in data processing with a minimum of 5 years as a project leader in a software support group; 3 years as Systems Programming Manager in a large scale IBM or Univac environment is preferred. The Selection Committee will look for practical experience in the following areas.

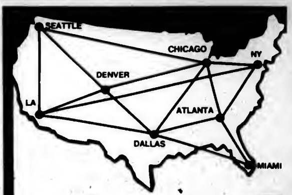
- **Data communications network planning**
- **RFP and benchmark preparation**
- **Project planning and scheduling**
- **Hardware capacity planning and performance measurement**
- **Technical procedure writing**
- **On-line real time systems development**
- **OS and data communications software maintenance**

The City offers competitive salary and an excellent benefit package including medical and dental coverage. Seattle is the cultural hub of the Pacific Northwest, an area that offers unlimited recreational opportunities.

Interested applicants are encouraged to send a letter of application, including resume, salary history and three letters of recommendation by November 23, 1978 to:

**City of Seattle**
**OMB/MIS**
**700 City Light Building**
**1015 Third Avenue**
**Seattle, Wa. 98104**
*Attn: John Brandon*

AN EQUAL OPPORTUNITY EMPLOYER



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## AT ISD, TELEPROCESSING IS OUR LIFELINE!

IBM 3033, MVS, TSO, CICS, and so on. We've got it all. Most important, we're successful at it!

During November we'll be open for telephone interviews on Saturdays (9-2) and Mon. - Wed. evenings until 7:30 PM, in addition to normal business hours. We are looking for top systems professionals for the following openings:

- Network Analysts/Programmers
- BAL Programmer Analysts
- Operations (OS) Specialists
- System Programmers
- Project Leaders
- Operations Supervisors
  Network & Production Control

To qualify you should have expertise in one or more of the following:

- Teleprocessing Systems
- Minicomputer Operating Systems
- Large scale IBM systems/applications

For more information, call
Russ Hauth at 714/937-2236

**TRW** *Information Services*
505 City Parkway West, P.O. Box 6230
Orange, CA 92668 (714) 937-2487
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## OPERATIONS CAREER OPPORTUNITIES

Due to recent reorganization of operations section of department, the following career opportunities are now available.

**MANAGER OF COMPUTER OPERATIONS**-Manage all activities of the computer operations, control and scheduling staff as well as maintain liaison with user departments to provide smooth production flow. Associate degree or equivalent combination of education and experience is required.

**ASSISTANT MANAGER OF CONTROL AND SCHEDULING**-Supervise day to day activities of control and scheduling staff. Considerable knowledge of computer operations and JCL is required.

Current hardware is IBM 370/158 using OS/SVS with TSO and large TP-network using CICS and DMS.

Excellent benefit package, a professional work environment and salaries commensurate with experience and education.

Submit resume by November 17, 1978, to personnel office, 110 Nisbet Building, Michigan State University, East Lansing, MI 48824. An Equal Opportunity Employer.

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## EDP - SYSTEMS CONSULTING

Detroit based Big 8 Accounting firm is seeking systems orienteted individuals to join our consulting staff.

The position requires a minimum of 2 years of programmer/analyst work experience and a functional knowledge of any of the following areas:

- Material and Manufacturing Systems
- Cost Systems
- General Ledger and Financial Reporting Systems

Technical undergraduate degree and advanced degree is preferred.

CW
Box 1753
797 Washington St.
Newton, Ma. 02160
*EEO/Affirmative Action Employer*

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## PROGRAMMERS

National Service Corporation is seeking Sr. Programmers with 5 yrs. exp. on any of the following large scale hardware: IBM 370/158 or /168 IMS & CICS Honeywell 6600 TDS & IDS Univac 1108 Exec 8 TIP & DMS. Salary to 24K + Bonus + B'nfts

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PERSONNEL AGENCIES, INC.
217 The Quadrangle
Balt., Md.
(301) 323-7770
7316 Wisconsin Ave.
Wash., D.C.
(301) 552-1960

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## PENNSYLVANIA

**Eastern and Central Pa.**
**Programming Openings**

Computer professionals needed at all levels. Our client companies assume our fees. Please send resume or letter of application: include desired salary and geographic location. PH (717) 346-2233, Datasearch Consultants, Bank Towers Bldg., Wyoming Ave., and Spruce St., Scranton, Pa. 18503.

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### SYSTEMS PROFESSIONALS
### NATIONWIDE SERVICE

**Dir MIS** To $45K
Midwest Div Mfg/Hdq Mfg/Fab exp.

**Fincl Sys Mgr** To $34K
Corp Hdq, Fincl/Acct IBM, Degree

**Proj Mgr** To $30K
Commercial, Tech Bkgd Fincl/Mrkt/Mfg Degree a +

**F-O-R-T-U-N-E DATA**

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505 5th Ave, NYC 10017
(212) 682-8600
Company inquiries invited

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## CENTRAL FLORIDA

**RESEARCH ENGR:** Data Compression MS or PhD EE. Multi-Nat'l corp—40K+
**STAFF ENGR:** Monolithic IC apps. in telecomm. MSEE. Lead R&D—33K
**STAFF ENGR:** PDP Assembly, real time/telephony applications—30K
**DESIGN ENGR:** Lead project group in MicroP and logic design—30K
**DESIGN ENGR:** Hardware, MicroP + interfaces. Simulators—28K
**SOFT DESIGN:** BSEE or CS maint. and diag. design. Telephony—27K
**ANALYST:** Strong hard/soft Telecomm exp. Leading mfgr.—26K
**PROGRAMMER:** 3 yrs. Scientific software/minis. High Growth—26K
**TECH SUPPORT:** PDP/Assembly, Fortran. High visibility—24K
**ANALYST:** DDS & Terminal Interface. Upward mobility. S&L—20K
**PROGRAMMER:** BSCS, CICS, TOTAL, IDMS. Manufacturing—19K
**ENGINEER II:** Entry level software support. PDP Assembly—17K

Contact: Technical
Recruiting Dept.
C/M of Orlando
3101 Maguire Blvd.
Orlando, Fla 32803
(305) 894-5651

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Programmer

## SYSTEM ANALYSTS

Information International, the leader in computerized illustrated typesetting technology, in Culver City, is currently staffing career positions for Marketing Support Analysts. Position responsibilities include the definition of new products, technical support for Marketing, proposal preparation, and interfacing with prospective customers to define system specifications. Candidates should have the ability to write clearly, knowledge of the Graphic Arts Industry, experience with mini-computer systems, and a degree in related fields.

Excellent benefits and working conditions. Send resume and salary history in confidence to:

M.F. McCurdy
**INFORMATION INTERNATIONAL**
5933 Slauson Ave.
Culver City, CA. 90230
*Equal Opportunity Employer M/F*

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## PROGRAMMER/ANALYSTS

### SALARIES $17K-$30K

Here's an outstanding opportunity to significantly advance your career designing State-Of-The-Art Systems while gaining above average compensation for your efforts by joining a fast growing, highly professional consulting firm with contracts in the Washington D.C. and Richmond areas. The Sands Corp. has immediate openings for Jr. and Sr. level Programmer/Analysts with a minimum of 3 yrs. experience, who possess the following qualifications and capabilities.

- In depth experience using IBM OS and MVS systems with expertise in JCL and IBM utilities.
- High proficiency in COBOL; other languages very desirable.
- Demonstrated Writing and Communication skills.
- Proven abilities in all levels of Systems Analysis, Design and Implementation.
- Capability to take direction as well as work independently on assigned tasks.

Previous experience with ON-LINE Processing, IMS, Software Package Evaluation, or Project Management Systems is highly desirable. Applicants who meet the above requirements will be provided a unique opportunity to join a highly competent staff of data processing professionals who enjoy.

- 4 DAY WORK WEEKS
- PAID OVERTIME
- A MONTHLY CASH BONUS IN ADDITION TO BASE SALARY
- GENEROUS FRINGE BENEFITS PACKAGE

If you are an aggressive, highly motivated individual who would like an opportunity to truly receive recognition and immediate compensation for superior effort send your resume and salary history to:

**THE SANDS CORP.**

10305 Conejo Lane
Oakton, Virginia 22124

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Sales

## FIELD SALES REPRESENTATIVES

Microsystems Division, a division of **Pertec Computer Corporation**, and a leader in the microcomputer field, has sales positions available in our Eastern and Central regions. Responsibilities include selling to and managing an independent network of distributors that market PCC's microcomputer to small businesses who are first time end users. This involves sales training, seminars, direct and user contact and complete sales support to the distributor. Requires a thorough knowledge of small business systems and their problems. Previous end user computer and/or software sales experience necessary. Reports to regional sales manager.

PCC employees receive an excellent benefit package, including life, medical, dental, long term disability insurance, stock purchase plan, savings/retirement plan, tuition refund, a liberal relocation plan, and up to 25½ paid days off per year. Interested and qualified candidates are invited to submit their resume with salary history to:

**Personnel Department**

PCC PERTEC COMPUTER CORPORATION
MICROSYSTEMS DIVISION
20630 Nordhoff
Chatsworth, California 91311

Equal Opportunity Employer M/F

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## SYSTEMS PROGRAMMER

*** San Diego ***

General Atomic Company is proud of its technological achievements and its broad spectrum of programs in the increasingly important energy field. We think you'll enjoy working in the stimulating and challenging environment of GA.

We're seeking a Systems Programmer with experience in implementing and maintaining UNIVAC 1100 (EXEC 8) operating systems software. Successful candidate will be made responsible for implementing, enhancing and maintaining DMS-1100, COBOL, QLP and other related data base software on a large UNIVAC 1100 with multiple data base applications.

Please submit your resume to Manager of Employment, Dept CW 101, P.O. Box 81608, San Diego, CA 92138. We are an equal opportunity employer M/F/H.

**General Automic Company**

# TECHNICAL WRITING PROFESSIONALS

## Creative Opportunities
## Professional Growth
## Challenging Assignments

Control Data Corporation's Publications and Graphics Division offers exciting opportunities for hardware and software writers with various backgrounds and levels of experience. Openings exist at several locations in the U.S. and Canada

**SOFTWARE WRITERS:** Join our technically challenging environment documenting state-of-the-art software You will prepare user manuals supporting Control Data's software product line, including operating systems, applications products, network communications, ALGOL, COBOL, FORTRAN, PL1, and Data Management languages. Ideal candidates will have a Bachelor of Science degree in computer science and some writing experience, or a combination of equivalent technical skills and education

**HARDWARE WRITERS:** Explore challenging positions in technical hardware writing. You will have opportunities to prepare field maintenance manuals for a broad array of complex hardware devices including computer mainframes, peripheral equipment, small processors, and miscellaneous electronic equipment. All positions require a college degree plus one or more years experience or equivalent (for example; field maintenance background with writing interest and ability).

Name ________________

Address ________________

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Telephone ________________

Specialty ☐ Hardware ☐ Software

Present Employer ________ Years Experience ____

Software Languages ________ Hardware Exp ________

Operating Systems Experience ________________

Preferred Location(s) (Check one or more)

☐ Arlington, VA
☐ Toronto CAN
☐ Minneapolis/St Paul MN
☐ Anaheim, CA
☐ San Diego, CA
☐ Sunnyvale CA

To find out more details about YOUR opportunities, submit your resume, a letter summarizing your qualifications, or this coupon to J W Lewis, Control Data Corporation, P O Box 0 (HQN03T), Minneapolis, MN 55440 You are assured of a personal, confidential reply You may also call TOLL FREE 24 hours a day (1-800-821-7700 extension 606)

CW

CONTROL DATA CORPORATION

**An Affirmative Action Employer M/F**

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## Brown & Root, Inc.

Brown & Root, the nations largest engineering and construction firm has immediate openings in Houston for Systems Projects Managers, Systems Analysts, Programmer/Analysts and Programmers with three or more year's experience The Computer Services Department is expanding to support large scale information system requirements including

- **Materials Management**
- **Personnel/Payroll**
- **Financial Reporting/Systems**
- **Project Cost Accounting**
- **Scheduling**
- **Estimating**
- **And Other Applications**

Data Processing professionals with experience in any or all of the following areas are desired

**DBMS Application Design/Programming — Project Leadership and Management**
**On-Line Application Design/Programming — CPM/Pert Processors**
**Analysis and Design of Large-Scale Business Systems**

For the programming positions COBOL and IBM 370 experience is preferred

These positions provide excellent income commensurate with your experience, a generous benefit package, excellent location and outstanding opportunities for both professional achievement and personal growth within our organization

Please send resume in complete confidence to

**Mr. T. E. Davis**
**P.O. Box 3, Houston, Texas 77001**

**Brown & Root, Inc.**

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# DATA PROCESSING PROFESSIONALS

COMTEN, INC., a computer engineering and manufacturing firm headquartered in the Minneapolis area, has embarked on the development of a corporate MIS function. With a 40% annual growth rate, new openings have been created at various levels, including:

- Data Base Administrator
- Systems Analysts
- Programmer/Analysts
- Programmers

These positions require experience with COBOL accounting and/or manufacturing applications. Knowledge of IBM 370, CICS, and TOTAL preferred.

Comten will reward your talents with excellent salary, benefits, and growth opportunities. As one of the fastest growing companies in the industry, we can enable you to develop your technical expertise. Send your resume today to Jane Christianson or call 800-328-9122:

**COMTEN, INC.**
**1950 West County Road B2**
**St. Paul, Minnesota 55113**

COMTEN

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# RACAL-MILGO IS EXPANDING ITS DEVELOPMENT TEAM!

We are an advanced development engineering company dedicated to solving todays data problems. We are currently involved in development areas that include:

- High end low speed modems
- A complete family of multiplexers
- Data network diagnostic systems
- The full spectrum of data terminals

If you have hardware or software experience in any of the following areas....

- microprocessor based system development
- Data communications
- Digital signal processing
- Digital system design
- Operating systems
- RSX 11M systems
- Adaptive Equalizers
- Real-time software
- Operating systems development

.... we can offer you the opportunities to expand your professional horizons. We have in-house custom LSI development capabilities and unbounded opportunities of all levels of engineering in software development people.

For Immediate and confidential consideration, call Rod Manning, collect at (305) 592-5996 or submit your resume in confidence to:

**Racal-Milgo — the new name for ICC**
**8600 N.W. 41st St., Miami, FL 33166 (305) 592-8600**

RACAL [illegible] Employer M/F

# ELDORADO LIVES!

San Francisco: surf, sunshine and sensational opportunity on the frontier of the EDP Job Revolution. And your scout: Logical Options, Inc., the California specialists in state-of-the-art recruitment for state-of-the-art careers.

In behalf of one of San Francisco's largest corporations, we, together with client technical supervisors, will be in Boston November 4 to 12 to interview top EDP professionals for numerous existing and projected positions with this highly sophisticated EDP user.

Our objectives include the filling of five new systems specialist and consulting positions, with salaries ranging from $22K to $28K. All are in-house assignments, responsible for product development from inception to implementation. Each involves the planning, organization and evaluation of systems for: Quality Assurance; Data Security; Proposal Evaluation; Standards & Documentation; and R&D. All provide variety, mobility, company-wide interface, and an excellent overview of all operations.

These are top technology situations, with IMS Data Base, MVS Multiple Processor, Telecommunications, Structured Technique and Advanced Methodology.

In addition to technical skills and experience, applicants must have strong facility in written and verbal communications. Our client offers complete relocation and a top benefit package. For an appointment, call Mr. Bernstein collect at (415) 777-3900.

Employer Retained Career Placement Service.

**LOGICAL OPTIONS, INC.**

One Market Plaza. Spear Tower
#2014 San Francisco, CA 94105 415/777-3900

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# systems representative

## Pansophic Is Planning the Software Systems of the 1980's TODAY!

There's no better time to consider a major career move to Pansophic than right now! Escalating marketing success resulting directly from innovative new concepts in software technology has created the ideal career growth climate for the talented Systems Representative capable of keeping pace with our ambitious plans for the future.

This important liaison position between customers and sales calls for a professionally motivated individual who enjoys being mobile and dealing with people on a continuous basis as well as becoming actively involved with installation, implementation and customer instruction at system sites. Current openings are in Chicago, Dallas, San Francisco and McLean, Va.

This position calls for excellent communications skills, a thorough familiarity with OS/DOS, 2-3 years systems or application programming background, a knowledge of COBOL and/or BAL and on-line programming and/or data base knowledge. A good understanding of PANVALET, EASYTRIEVE and/or PANEXEC would be considered essential for success. Of utmost importance is the combination of well-defined career goals and a creative approach to problem-solving.

In addition to an excellent salary and benefits package, the selected candidate will receive indepth training in state-of-the-art software technology and open-ended opportunities for career growth. For consideration, send a resume to Tarie Yee, PANSOPHIC SYSTEMS, INC., 709 Enterprise Drive, Oak Brook, IL 60521, or

**Call Collect (312) 986-6026**

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**PANSOPHIC**

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## EDP OPPORTUNITIES

**Systems Analysis**- Proj Ldr 370/158 DOS On line database pension retirement systems – $25-28K

**Personnel** Recruiter-employee relations – $21K

**Project** Ldr-credit card syst – $27-33K

**Systems Prog**-Westchester loc, 3-5 yrs exp OL 1 NOC – $25-27K

**Prog Anal** Westchester loc 370/168 OS VS IMS 1-5 yrs exp – $17-25K

**Financial** Systems Anal proj ldr re-design fincl G/L, A/R – $25-27K

**Database** Administrator Westchester loc, IMS OL 1 OC data dictionary – $27-30K

**Prog Anal** HP 3000 Image Query On line COBOL – $19-22K

**Proj Ldr** OS/VS JCL utilities On Line BAL – $28-31K

**Syst Prog**-Proj ldr Conn loc 370/158 On line VM VS 2.– $24-31K

**Prog Systems** 32 RPG lrn 370/168 NYC loc-relocate to Southwest – $21K

**Prog Anal** Intl corp CICS OL 1 IMS MVS COBOL BAL degree – $27K

**IMS Database** designer DL 1 DC – $31K

**IMS Software** Internals min 1 yr exp deg preferred – $21-27K

**Fincl** Systems Anal Fortran, BASIC MBA – $18-21K

**Int'l Corp** Systems 3 RPG 2 mod programmer. Learn 370 – $19-21K

**PDP 10** or equiv COBOL Fortran PL1 exp. Masters deg pfd, prodn mgt syst – $25-27K

**Fincl** Systems Cnslnt Fortran BASIC – $27K

**Data Base** Admin Database/taskmaster DOS/VS – $27-31K

**Proj Ldr** On line mfg applicatns COBOL project control, degree – $25-27K

**Mini** computer sales – $19-27K

**Wall St**-maj new development proj ldr P&S firm inventory – $32K

**Financial** Prog/anal Fortran PL 1 fixed income systems – $23-29K

**Timesharing** Analyst programmer options CMS OS PL1 Ramis – $21K

**Proj Mgr** Group Ins exp nec 370 OS IMS CICS environ – $31K

**Data General** Applications-exp degree reqd. ALP Fortran – $27K

**Methods** & Procedures Anal – $19-21K

**Database** Cnslnt deg req, multi database exp desirable. 30-50% trvl – $65K

**Fortune Co** seeks degree PDP 11 COBOL Dibol RSTS-E to design maj systems – $27K

**PDP 11** Dibol Cobol RSTS-E desing maj persnl syst – $25K

**Timesharing** anal/prog maj investment banking client – $25K+Bon

**Data Base** anal IMS O 11 DC – $Open

**Software** Applications anal IMS VS Software support – $27K

**Bill Borrelli** (212) 349-3610
William Harris Assoc
150 B'way agency NY 10038

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# APPLICATIONS PROGRAMMER

In the MIT Department of Electrical Engineering and Computer Science to maintain and enhance application programs for current management information systems; specify, design and code new application programs; document new or revised programs, train and assist users as necessary. Programming experience and an Associate's degree, or equivalent, required. PL/1, Multics or ROMS experience helpful.

Please submit resume to:

MIT Personnel Office
400 Main Street
Cambridge, MA 02139
253-4250
Attn: Job No. C78-29

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**MIT**

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# COMPUTER PROFESSIONALS

## "Don't Just Watch Us Shine"

Join the excitement of our expanding airline – New service to Europe – Paris, London, Amsterdam, Frankfort; New innovations in our service to the fastest growing areas of the U.S.A. – Miami, Houston, Las Vegas, San Diego, Los Angeles, San Francisco, New York. To be the best in our field, we are acquiring the newest in IBM Large Scale computers – 3031, 3032, 3033 – the first one (3031) is already installed.

**PARS PROGRAMMERS**
ACP, support and on-line applications, minimum one year experience.

**COBOL PROGRAMMER**
IMS/VS-DC Applications. Minimum two years of programming experience.

**OPERATIONS SUPERVISORS**
Minimum five years experience in a Large Scale IBM 360/370 OS/MVS/Tele-communications environment.

The above positions are newly created and located at our Miami Headquarters. Levels and salaries are commensurate with experience, and liberal travel and fringe benefits are available.

Send resume, including education and salary history to:

NATIONAL AIRLINES
Employment Office Department C
P.O. Box 592055, AMF
Miami, Florida 33159
An Equal Opportunity Employer M/F

**National Airlines**

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PROGRAMMERS

# JOIN THE CENTER THAT CENTERS AROUND THE 3033

Our full-service Data Center currently runs 2 of the new 3033's. We are seeking professionals who would like to become associated with one of the leading cost efficient computer utilities in the Western United States and to work with the newest and most sophisticated computers in the world. We are located in the West San Fernando Valley, away from traffic and congestion. MIC is just 30 miles from Los Angeles and 30 minutes from the Pacific Ocean.

We currently have openings
for the following professionals:

## SYSTEMS ENGINEERS

Strong knowledge of JCL and MVT or MVS concepts. Programming skills in at least one of the following languages: PL/1, FORTRAN, APL or COBOL; assembler language skills; strong debugging skills and demonstrated ability to work with Data Center customers. TSO experience a plus.

## PROGRAMMER ANALYSTS

Experience should include design, development, implementation and maintenance of information systems utilizing multiple IBM 168's operating under MVS with IMS, RJE and TSO facilities.

Should have 3-5 years of COBOL programming, preferably within IBM OS, VS, or MVS environments.

## DATA BASE ADMINISTRATOR

3 to 4 years experience in IMS DB/DC environment, preferably as DBA or as a systems programmer in support of IMS DC Systems.

For immediate consideration, please send your resume or write, including salary history, in confidence to:

Bob Bonney

Litton

LITTON MELLONICS
INFORMATION CENTER
6701 Variel Avenue
Canoga Park, Calif. 91303

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## SYSTEMS PROGRAMMERS $31,000+

Expanding Mid-Atlantic Financial Co. seeks individuals to work at problem determination systems level. Electronics Fund Transfer, Message Switching, Telecommunications Network applications background ideal for this large, prominent IBM user. Sal. to $31,000+. Resume & Salary requirements to: Professional Search Personnel, MIS-EOP Dept., 4900 Leesburg Pike +311, Alexandria, VA. 22302. No contracts, No Fees to you.

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We will pay you to change jobs!

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## DATA PROCESSING HEALTH CARE SYSTEMS

The Medical College of Wisconsin, located in suburban Milwaukee, is in the early stages of implementing a total hospital information system. We are looking for expereinced Data Processing Professionals in the health care field interested in a ground floor opportunity. The system when implemented will use state of the art hardware, data base and online programming techniques. We offer an exciting challenge, competitive salaries and excellent benefits.

### SUPERVISOR OF HOSPITAL APPLICATIONS

Supervisor of systems and programming personnel. At least 3 years experience in hospital data processing environment required.

### SENIOR SYSTEMS ANALYST

To define requirements for hospital systems. May work as project leader or independently. Hospital applications background required.

### SENIOR ANALYST/PROGRAMMER

To implement online, data base patient care systems. Hospital applications background required.

Send a resume or call collect:

(414) 931-1042
**MEDICAL COLLEGE OF WISCONSIN**
Computer Center
1725 West Wisconsin Avenue
Milwaukee, Wisconsin 53223

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## TOYOTA

Toyota, the nation's number one automobile importer has the following Programming positions available:

### IMS DC Project Leader

Supervise a project group of IMS Support Systems Programmers and Systems Analysts. Responsibilities will include development and implementation of ground floor IMS DB/DC on-line systems including back-up, recovery and MTO operation for IBM 158 AP and 3033. Interface with user management combined with personal technical involvement makes this a rewarding and stimulating position. Requires prior DB/DC system experience and supervisory ability; degree preferred.

### IMS Technical Specialist

Responsible for establishing and monitoring the DB/DC test, and production environment. Develop and support MFS, BTS, and other test tools. Monitor systems performance and efficiency. Requires previous IMS systems programming experience in on-line environment. Degree preferred.

Toyota offers comprehensive company paid benefits including medical/dental coverage, in an attractive Southern California location. Our software is State-of-the-Art (MVS, JES 2, VTAM, NCP, and IMS DB/DC) and our plans are aggressively growth oriented. (IBM 3033 to be added January 1979).

For immediate consideration, please forward resume with salary history to:

John R. Freeman

**TOYOTA MOTOR SALES, U.S.A., INC.**
2055 W 190th St. Torrance, Calif 90504
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## DATA PROCESSING MANAGER

Unusual opportunity in Chicago West Suburban area for a Data Processing Manager with mini-computer experience.

We are a rapidly expanding Midwest retailer who is in need of a DP pro to establish a data processing department. The DP Manager will be able to evaluate hardware, design systems and interface with all levels of management. The individual will be responsible for the recruitment of 2 to 3 professionals as the department develops.

The successful candidate will have a combination of four (4) years or more operational management and data processing experience in systems, operations (including scheduling, planning and design) and programming in a mini computer environment. The individual should be knowledgable in financial systems, inventory control and POS.

We offer an excellent compensation and fringe benefit program for the qualified professional.

For local interviews, send resume and salary history to:

**Controller**
**P.O. Box 922**
**Oak Brook, IL 60521**

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## Data Processing
## VA. EXCLUSIVES

Our client, a leading textile manufacturer, is establishing a data processing department in the beautiful Shenandoah Valley of Virginia. This is an opportunity to get in on the ground floor with a blue chip company. Listed below is a sampling of available positions:

**SYSTEMS/ANALYST**
(Payroll) $24,000
**SYSTEMS/ANALYST**
(Retail) $25,000
**PROGRAMMER/ANALYST**
(Head Type) $22,000
**PROGRAMMER/ANALYST**
(DOS/OS-Payroll) $21,000
**PROGRAMMERS (2)**
(DOS/OS-COBOL) $19,000
**SYSTEMS PROGRAMMER**
(CICS, OL/t) $25,000
**PROGRAMMER/ANALYST**
(Data Base) $21,000
**PROGRAMMER**
(CICS, OL/t) $21,000
**PROGRAMMERS (2)**
(DOS/OS) $16,000+
**COMPUTER OPERATOR-LEAD**
(DOS/OS-Power) $14,000
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## RICHMOND EXCLUSIVES

**TECHNICAL WRITER — OP**
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**SYSTEMS/PROGRAMMER**
(DOS/VS Assembler-World-wide travel) $25,000
**PROGRAMMER**
(DOS/VS) $22,000
**SR. PROGRAMMER**
(Financial) $21,000
**PROGRAMMER**
(COBOL-Assembler) $16,500
**PROGRAMMER**
(OS Shop-New "spot") $18,000

Call (804) 288-1159
or send resume
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Lawn Mall,
Richmond, Virginia 23230.

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OVERSEAS
ADVENTURE $40K+

## IRAN

Applications programmer, Systems Engineer, H-6000 or L/66, GCOS/COBOL/GMAP IDS TPE/MULTICS, US firm has 18-24 mo tours w/fam. Ex financial pkg in Tehran. Skt 1 hr fm office. Rush resume: Cybermetrics Corp., P.O. Box 579, McLean, VA 22101. (703) 356-1997. Other positions avail.

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MS&S Murphy, Symonds & Stowell, Inc.

## NORTHWEST
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Whether your expertise is Prog, Sys Design, or D.P. Mgmt we can put you in touch with the D.P. Market in the Pacific N.W. Send resume or call: 503-224-9575. 811 S.W. 6th Suite 710, Portland, Ore. 97204. OR: 206-623-6790 2200 6th Ave, Suite 1200 Seattle, WA 98121.

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## Compiler Development
### High Level Language Design

We have an immediate opening for a person with interest and experience in compiler design and development for high level languages. Design of a retargetable, portable compiler offers a challenge to a computer professional with a background in programming language translation.

Located near Portland, Oregon we are within a two hour drive of the Cascade Mountains and Ocean Beaches. The close-by natural playgrounds and the City of Portland provide a variety of recreational and cultural interests.

Salary is open. Benefits include educational support, insurance and profit sharing programs.

Send detailed resume and salary history to Mary Walhood, TEKTRONIX, INC., P.O. Box 500, W23, Beaverton, Oregon 97077.

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## SOFTWARE ENGINEER

Our engineering Development Group has the prime responsibility for both the development and engineering of state-of-the-art product ideas. Their efforts play a large part in continuing our position as a world leader in Process Management and Control Systems. This is an extremely challenging area offering good personal visibility plus an opportunity for technical expression that may be lacking in your present position.

You will implement input/output drivers, communications and console handling programs for new microprocessor-based man/machine interfaces. You will also take part in software development — specifying, designing, documenting, coding and integrating programs. Possible future assignments include application of microprocessors to further new products in the Systems Software Development Department.

You must have a BS in Computer Science, Mathematics or Physical Sciences with two years in real time, assembly language programming, and 8085 microprocessor programming experience desirable. Knowledge of operating systems and complex data structures required.

Forward resume, including salary requirements to Mike Boyd, Dept. 116-CW, The Foxboro Company; 38 Neponset Ave., Foxboro, MA 02035. Foxboro is an equal opportunity employer, M/F.

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We offer Computer services to member hospitals. Such services include patient accounting, Lab Reporting, payroll, etc.

The Marketing Manager is responsible for maintaining existing accounts and developing and expanding our Market area.

The skills required for this position are:

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- Demonstrated written and oral communication abilities
- Promotion or sale of intangibles preferred
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- Understanding of accounting and basic familiarity with EDP desired but not required

Please be sure your resume specifies what you did in your past positions and what you accomplished.

Top notch fringe benefit package offered. Salary commensurate with experience. St. Paul, Mpls suburban location. Please forward resume to:

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797 Washington St.
Newton, MA 02160

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### SEATTLE

in the Evergreen Wonderland of the Pacific Northwest

**EDP PROJECT LEADER** for established manufacturing firm in desirable suburban location. Good opportunity for someone with systems, to $25K, fee paid.

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A newly created management position has been established within a high prestige development organization.

Our client is seeking a disciplined professional to head up a Software Quality Assurance Group. Responsibilities include participation in new product design with special emphasis on formal planning and coordination of test activities. Ongoing involvement in product support and enhancement will provide the opportunity for overall product quality control.

The ideal candidate will have first level supervisory experience, and a background in real time systems development and testing, preferably in telephone applications. A career interest in the development of reliable, high quality mini-micro based products is the primary requirement.

A prompt, personal acknowledgement will be given when you send your resume or call collect.

**V.J. Zapotocky**
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**214/241-0003**

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# DP PROFESSIONALS

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cost of living lower
and the location's great

The combination of all the things you work for and long-term growth opportunity are offered by our client, a major manufacturer of industrial, commercial and consumer products located in a friendly northwestern Pennsylvania city. The area is rich in potential for the good life, while the living cost is modest compared to most metropolitan centers. And to top it all, salaries are above average enhanced by benefits that add up to real family security.

**LEAD SYSTEMS ANALYST**
Must be good organizer, good communicator with systems design and project management experience. Manufacturing background desired for strong performance in financial applications using ANS COBOL in an IBM 370 OS/VS IMS environment. Degree in Math, Business or Engineering required. MBA desirable.

**SENIOR APPLICATIONS PROGRAMMER**
Needs good technical abilities to provide program design, coding and testing on large-scale accounting/financial applications in a manufacturing environment. Must be experienced in 370 OS/VS IMS using ANS COBOL. Degree in Business, Math or Engineering desirable.

**PROGRAMMER ANALYST**
To assume responsibility for payroll and personnel related projects. Needs background in MSA payroll and experience in financial/accounting applications using ANS COBOL on IBM 370 under OS/VS IMS. Must have structure design and programming experience. Degree in Math, Business or Engineering required.

For immediate action, **CALL COLLECT:**

Contact Ms. Hercourt
Call Mon-Fri, 9am-5pm
(212) 683-6171

or if you prefer, send your resume to:
**Dept. 419, 101 Park Ave. New York, N.Y. 10017**

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# SPECIAL MESSAGE:

## MICROPROCESSOR ENGINEERS

## EW SOFTWARE ENGINEERS

Major NEW Avionics ESM programs with production follow-on to provide systems operating capability through the year 2000 requiring state-of-the-art development of multifunction distributed microprocessors, now provide innovative engineers with an ideal new career opportunity.

AMECOM has an immediate need for:

Six (6) **MICROPROCESSOR DESIGN/ DEVELOPMENT ENGINEERS**

Ten (10) **REAL-TIME ELECTRONIC WARFARE SOFTWARE ENGINEERS**

These positions range from Member of the Technical Staff to Senior Scientist with salaries to $35,000.

If this sounds like the opportunity you have been waiting for, we urge you to call COLLECT or send your resume including salary history to:

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## Systems Programmers Analysts

Merck & Co., Inc. is a worldwide leader in the pharmaceutical industry and our future success will depend a great deal on the professionals who continue to develop and implement the most advanced computer systems witin the industry.

### SYSTEMS PROGRAMMER ANALYST

Requires 3-5 years experience working with large-scale state-of-the-art systems control programs, including 1-3 of those years working with CICS/VS or similar teleprocessing monitors. Must have thorough knowledge of Assembler, IBM systems utilities and JCL; TSO a definite plus. You'll be involved with software services to teleprocessing monitors including CICS/VS will maintain, modify CICS/VS modules, internal tables, and implement new software.

### SR. SYSTEMS PROGRAMMER

Requires Bachelor's Degree, or equivalent, in Computer Science, 2-3 years experience in systems generation/maintenance of IBM MVS/JES2 operating system. Must also have background in evaluation and installation and maintenance of computer software and experience in high level languages or Assembler. Will be involved in system generation, and testing of MVS/JES2 system including evaluation, installation and maintenance of computer software such as retrieval languages, data base, compiler, etc.

Contact us if your background and interests match ours. Send resume with salary history to Mr. F. Mieso,

**MERCK & CO., INC.**
P.O. Box 2000 Rahway, New Jersey 07065
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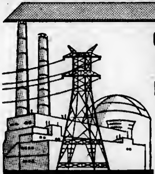

# OPPORTUNITIES FOR COMPUTER PROFESSIONALS IN BUSINESS COMPUTER APPLICATIONS:

## ANALYST PROGRAMMERS

We have openings for experienced individuals who have a proven track record in large applications systems using advanced IBM 370 hardware and software technology. If you desire to help us ready for the 1980's, if you produce quality systems on time, within budget, within specifications, you may like the challenges.

## METHODS AND PROCEDURES

We need an experienced person in business methods and procedures to assume a responsible position in our Management Information Systems Group. Responsibilities will include Methods, Procedure Writing, and Field Training. Applicants should have five or more years of experience in methods work and procedure writing for computerized businesss systems. A proven leadership record with verbal and written communication skills in a demanding environment is essential.

Please apply in writing with educational, employment and salary requirements to:

Mrs. Linda M. Heidenis

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# CONTINUED GROWTH

## CENTRAL NEW ENGLAND

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### SYSTEMS PROJECT LEADER-MFG SYSTEMS

Design and installation of Mfg and Business systems. COBOL req'd Exp in Mfg Processes and Production Control helpful.

### SYSTEMS PROJECT LEADER-BUS SYSTEMS

Responsible for design and installation of Accounting and Business systems. IBM 370/OS, COBOL exp requirad.

Company pays all Fees, Inverview and Relocation Expenses.
Send Resume or call A.J. Rachele at:

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(413) 734-5628

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# PROGRAMMING

The University of Deleware is seeking candidates for openings in the following areas of administrative date processing.

**Senior Programmer Analyst(s)** — responsible for the design, programming, and implementation of university administrative computer applications with some experience with Burroughs equipment. Minimum qualifications require equivalent of a bachelor's degree with 3 to 4 years' effective experience.

**Programmer Analyst(s)** — responsible for the design, coding and testing of university administrative programs includng systems testing, user training, and preparation of final documentation with some experience with Burroughs equipment. Minimum qualifications require equivalent of a bachelor's degree with 1 to 2 years' effective experience.

These positions represent an opportunity to work within a centralized university computing center utilizing advanced teleprocessing and data base techniques on a large scale Burroughs B7700 system.

Submit resume including salary requirements by November 30, 1978 to:

Daniel J. Helmerich
Assistant Director
Administrative Systems
Computing Center
University of Delaware
Newark, DE 19711

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# Advanced Energy Management and Control Systems are a dynamic new business at CSC.

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**Individuals at all levels are needed now to assist in design, implementation, and integration of application control programs.**

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- **Chiller/Boiler Optimization**
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- **Process Control Algorithms**

**. . . including at least 2 or more years realtime system related background.**

**For more information, or to apply, call Dianne Reason toll free at (800) 336-0429 or (703) 533-8877 collect.**

Otherwise, please mail your resume in full confidence to Dianne Reason, Dept. 450.

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6565 Arlington Boulevard
Falls Church, VA 22046

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**DATA PROCESSING OPENING**

Manufacturing company in SW Ohio has opening for person with background of programmer/analyst and experience in 2 or more of-

IBM S/3 — 15D with CCP
COBOL, RPG II

Knowledge of "CINCOM TOTAL" DBMS helpful but not required

Submit resume to:

Neomi A. McKee,
Personnel Director
YELLOW SPRINGS INSTRUMENT CO., INC'
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Yellow Springs, OH 45387

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and Software Systems Engineers

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Excellent opportunities are available now to join the CSC group providing technical and system engineering assistance to the China Lake Range Control Center, or Vandenburg Air Force Base Logistics Center.

## 1. SOFTWARE SYSTEMS ENGINEERS

— with 8-10 years experience in real-time systems, displays, operating systems and command and control systems. Familiarity with MIL procurement and documentation is desirable. BS preferred.

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— with 8-10 years experience in video systems and general background in digital systems. BS preferred.

Please mail your resume in full confidence to Judy Lewis, Dept. 449.

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SOFTWARE ENGINEERS...

# Total involvement is only the beginning...

When you join the Atlantic Operation, you will immediately enter a level of project involvement possible only in a new, dynamic organization like ours. You will be able to contribute in every aspect of a project, from customer liaison and problem definition through final product development and user support. You will employ such sophisticated software techniques as top-down analysis, code-walk-throughs, and automated development tools.

We also offer the accelerated career development of a genuine ground floor opportunity created by the synergistic effects of expanding markets and advancing technology. Rapid advancement is the norm for fast-track individuals who can handle responsibilities and high-visibility projects of global scope and impact. Further, you will make state-of-art level contributions in areas such as network management, digital switching support systems, common channel signaling, automation of test sequences, operator call processing, centralized maintenance centers, and other commercial applications. As we've said, total involvement is only the beginning.

Only recently established, Atlantic Operation's primary objective is to design and develop real-time computer based systems to resolve unique problems within the commercial telecommunications industry. The software engineers who have joined us have helped to determine the scope of our endeavors by the influence of their abilities, interests, and ambitions. We currently seek professionals with similar talents and goals to augment these efforts.

We are looking at all levels for dedicated, talented software professionals with BS or MS degrees, real-time programming experience, and familiarity with languages such as PL-1, Assembly, ALGOL, or PASCAL.

Make contact with the Atlantic Operation today; if you are looking for total involvement and career growth, it will be only the beginning.

*Send resume and salary requirements to F.C. Brown, Sylvania Technical Systems, Inc., Atlantic Operation, 140 First Avenue, Waltham, Massachusetts 02154.*

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**At The Atlantic Operation.**

GTE SYLVANIA

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# PROGRAMMER/ANALYST

## FOR VERMONT

Fast growing U.S subsidiary (Located in Central Vermont) of an old established international manufacturer has an immediate opening for an aggressive programmer/analyst. Experience must include 2 or more years of analysis, design and programming (Cobol, RPG 11) in financial application areas (A/P, A/R, P/R, General Ledger). Current H/W: S 3/12, 3340 Disks, MFCU, L/P.

Responsibilities will involve working with operations management to develop and service programs for diversified uses.

We can offer you not only an excellent starting salary and full company benefits, but also a VermontLifestyle you'll love getting used to. It includes a thoroughly enjoyable 4-season climate, good housing and schools, friendly and interested people, and some of the best Skiing, Fishing, and Water Sport activities in the country.

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Personnel Director

VERMARCO

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# OPENINGS IN SUNNY NEW MEXICO

## UNIVERSITY OF NEW MEXICO

**Associate Director**
**Operations and Systems**

Management experience in large-scale systems software (IBM compatible OS-VS) is a prerequisite, as is a solid systems programming background.

A Master's Degree in Computer Science (or related field) is preferred.

**Associate Director**
**Information Systems**

Responsible for the maintenance and development of all administrative systems. Heavy experience in managing systems analysts and programmers engage in batch and distributive processing work is a necessity. Should be familiar with Data Base Management and Project Control Techniques.

A Bachelor's Degree in Computer Science (or related field) preferred.

**Systems Analysts or Programmer positions are also available.**

**Inquiries should be directed to: Dr. Stoughton Bell, Director; Computing Center; University of New Mexico; Albuquerque, N.M. 87131 no later than November 15, 1978.**

*We are an EOE M/F*

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# Computer Professionals

JOHN DEERE

Deere & Company, a leading manufacturer of agricultural equipment, has openings for the following positions:

## SYSTEMS ANALYSTS

You must have a minimum of 2 years experience, including IMS, in an IBM environment, preferably in manufacturing areas. Responsibilities will be varied.

## PROGRAMMERS

Prefer a minimum of 2 years experience including IMS with IBM equipment plus a knowledge of one or more of the following languages: COBOL, PL1, and FORTRAN.

We offer qualified candidates excellent starting salaries and comprehensive company-paid benefits including paid relocation to Iowa. For consideration, direct your inquiry with salary history to:

**Roneld H. Like**
**Deere & Company**
**Moline, Illinois 61265**
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# HUNTINGTON NATIONAL BANK

## COLUMBUS, OHIO

This progressive midwest bank has need for persons with the following qualifications:

## PROGRAMMER - PDP

Degreed individual with a minimum of one year programming experience. Specific requirements include knowledge of PDP equipment programming and experience in RSTSE, RT-11, and DEC systems utilities. Knowledge of COBOL and basic is essential, and financial programming experience would be helpful. This position will involve responsibility for an on-line system.

## PROGRAMMER/ANALYST

Degreed individual with a least one to three years COBOL programming experience. Position involves both new and maintenance programming as well as independent research projects.

Excellent salary and benefits program.

Please send resume and salary requirements to: Huntington National Bank, 17 S. High St., Columbus, Ohio 43215, Attn: Employment Supervisor, or call (614) 469-7295 for additional information.

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# Technical Specialist

## CDC Support Services

Broadly diversified energy systems company, COMBUSTION ENGINEERING runs on one of the most advanced state-of-the-art data processing and communications networks currently in operation. Our equipment includes a CDC 7600 and CYBER 172 which are part of a worldwide computer network.

Responsibilities will include consulting, user education, documentation, programming and benchmarking new hardware and software. The successful candidate will have 3+ years experience and considerable expertise in Control Data computers, including competence with FORTRAN and BASIC (COBOL and/or APL a plus), a thorough knowledge of CDC control language, uitilities, and familiarity with COMPASS, system internals, and/or database applications.

Located at our Windsor, Connecticut Data Center, this position offers an excellent starting salary and a full range of benefits. For prompt, confidential consideration, forward your resume, including salary history, to: H.R. KAIN, COMBUSTION ENGINEERING, 100 Lamberton Road, Windsor, Connecticut 06095.

**COMBUSTION ENGINEERING**

**The Energy Systems Company**

*An equal opportunity employer M/F*

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CSC

# CUSTOMER SYSTEMS REPRESENTATIVE

## THE COMPANY:

Computer Sciences Corporation, a leader in the field of information sciences with over 8,000 employees, provides the nation's government and business communities with remote computing services through its Information Network (INFONET) Division. The acceptance of these services has been highlighted by an achievement of substantial profitability and continuous growth.

## THE OPPORTUNITY:

You should have at least 3 years of diversified applications experience and knowledge of COBOL, FORTRAN and Data Base Management Systems. IBM 370/ JCL desired, but not mandatory.

## THE REWARDS:

CSC offers comprehensive company paid benefits, tuition reimbursement, paid vacation after 6 months and opportunities for career advancement. For information regarding these positions, please contact:

Dick Terhorst
(213) 553-0888

**COMPUTER SCIENCES CORPORATION**

**INFONET Division**
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Data acquisition and reduction
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Multiprogramming operating system
  experience with thorough knowledge of the
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Knowledge of foreground/background
  programming; real-time I/O programming
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Data acquisition and reduction
----Fourier analysis
----Statistical analysis
Graphic display experience
Multiprogramming operating system
  experience with thorough knowledge of the
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Knowledge of foreground/background
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Engineering-Physics, or Math education
Experience on several computers desirable
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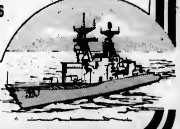

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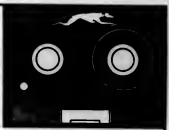

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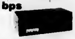
| **3600 bps**  | **MODEM 3300/36**<br>Dial or dedicated operation with reverse channel. Built-in auto-answer on dial-up | $3620<br>$85/mo.* | **$950**<br>**$38/mo.*** |
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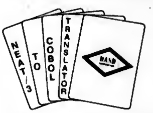

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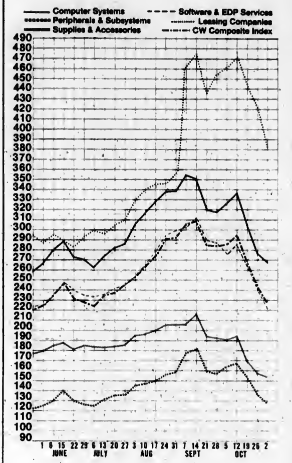

# Earnings Reports

### ADVANCED COMPUTER TECHNOLOGY
Year Ended March 31

| | 1978 | 1977 |
|---|---|---|
| Shr Ernd | $.05 | $.11 |
| Revenue | 15,104,296 | 11,884,065 |
| Earnings | 62,059 | 142,672 |

### AMPEX
Three Months Ended July 29

| | 1978 | 1977 |
|---|---|---|
| Shr Ernd | $.48 | $.41 |
| Revenue | 87,171,000 | 70,774,000 |
| Tax Cred | 2,068,000 | 1,890,000 |
| Earnings | 5,609,000 | 4,522,000 |

### COMPUDYNE
Three Months Ended June 30

| | 1978 | 1977 |
|---|---|---|
| Shr Ernd | $.03 | $.17 |
| Revenue | 11,945,770 | 11,071,073 |
| Disc Op | . . . | 551,000 |
| Earnings | 190,711 | 579,281 |
| 9 Mo Shr | .04 | 32 |
| Revenue | 34,219,624 | 32,444,549 |
| Disc Op | | 653,805 |
| Tax Cred | | 59,093 |
| Earnings | 253,918 | 1,157,169 |

a-Restated

### RECOGNITION EQUIPMENT
Three Months Ended July 31

| | 1978 | 1977 |
|---|---|---|
| Shr Ernd | $.24 | $.26 |
| Revenue | 23,000,000 | 19,400,000 |
| Tax Cred | 300,000 | 500,009 |
| Earnings | 7,400,009 | 1,300,000 |
| 9 Mo Shr | .71 | 68 |
| Revenue | 63,700,000 | 54,900,000 |
| Tax Cred | 900,000 | 2,200,000 |
| Earnings | 4,200,000 | 5,200,000 |

### DYNASCAN
Nine Months Ended Sept 30

| | 1978 | 1977 |
|---|---|---|
| Shr Ernd | $.82 | a$.14 |
| Revenue | 50,037,000 | 68,095,000 |
| Earnings | 2,413,000 | 407,000 |
| 3 Mo Shr | 30 | |
| Revenue | 17,402,000 | 12,432,000 |
| Earnings | 875,000 | (662,000) |

a-Reflects a 3% stock dividend paid in January and June 1978

# Computerworld Sales Offices

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3 Bruce Street
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Phone: 929-5388
Telex: SECCO AA25468

# Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, NOVEMBER 1, 1978

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

### COMPUTER SYSTEMS

| EXCH | | 1978 RANGE (1) | CLOSE NOV 1 1978 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| A | AMDAHL CORP | 28- 69 | 44 1/2 | + 3/4 | +1.7 |
| N | BURROUGHS CORP | 59- 87 | 74 5/8 | +3 3/8 | +4.7 |
| O | COMPUTER AUTOMATION | 15- 44 | 18 | -1 1/2 | -7.6 |
| N | CONTROL DATA CORP | 23- 44 | 34 1/8 | +1 5/8 | +5.0 |
| 9 | CRAY RESEARCH INC | 21- 74 | 53 | 0 | 0.0 |
| N | DATA GENERAL CORP | 42- 71 | 59 1/2 | +2 1/8 | +3.7 |
| N | DATAPOINT CORP | 34- 75 | 55 3/4 | +3 1/4 | +6.1 |
| N | DIGITAL EQUIPMENT | 39- 54 | 49 3/4 | +3 3/4 | +8.1 |
| N | ELECTRONIC ASSOC. | 2- 13 | 7 1/8 | -1 1/4 | -14.9 |
| A | ELECTRONIC ENGINEER. | 10- 19 | 10 1/8 | -2 1/4 | -18.1 |
| N | FOUR-PHASE SYSTEMS | 19- 46 | 28 5/8 | -2 | -6.5 |
| N | FOXBORO | 28- 40 | 33 1/4 | - 1/2 | -1.4 |
| O | GENERAL AUTOMATION | 7- 26 | 14 1/2 | 0 | 0.0 |
| O | GRI COMPUTER CORP | 1- 3 | 1 1/8 | - 3/8 | -25.0 |
| N | HEWLETT-PACKARD CO | 62- 93 | 84 3/4 | +4 3/4 | +5.9 |
| N | HONEYWELL INC | 43- 72 | 63 5/8 | +1 3/8 | +2.2 |
| N | IBM | 236-305 | 276 1/8 | +2 3/8 | +0.8 |
| O | MANAGEMENT ASSIST | 9- 29 | 15 1/2 | -1 5/8 | -9.4 |
| O | MICRODATA CORP | 10- 23 | 12 1/8 | -2 3/4 | -18.4 |
| O | MINI-COMPUTER SYST | 4- 8 | 5 | - 3/4 | -13.0 |
| O | MODULAR COMPUTER SYS | 7- 17 | 9 1/2 | -1 | -9.5 |
| N | NCR | 37- 67 | 61 | - 5/8 | -1.0 |
| N | PRIME COMPUTER INC | 20- 43 | 27 1/2 | -1 3/4 | -5.9 |
| N | PERKIN-ELMER | 17- 28 | 23 1/4 | +1 1/8 | +3.0 |
| N | RAYTHEON CO | 29- 38 | 47 1/2 | +1 1/4 | +2.7 |
| N | SPERRY RAND | 33- 49 | 42 7/8 | + 3/4 | +1.7 |
| A | SYSTEMS ENG. LABS | 11- 24 | 13 1/4 | -1 1/4 | -8.6 |
| A | WANG LABS. | 12- 32 | 22 1/4 | - 3/4 | -3.2 |

### LEASING COMPANIES

| EXCH | | 1978 RANGE (1) | CLOSE NOV 1 1978 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| O | BOOTHE COURIER CORP | 13- 21 | 16 3/4 | -1 3/4 | -9.4 |
| O | COMDISCO INC | 5- 22 | 15 1/4 | -1 1/2 | -8.9 |
| A | COMMERCE GROUP CORP | 1- 1 | 3/8 | - 1/8 | -25.0 |
| A | COMPUTER INVSTRS GRP | 1- 7 | 3 3/8 | + 1/8 | +3.8 |
| N | DATRONIC RENTAL | 1- 3 | 2 1/2 | - 1/8 | -4.7 |
| A | DCL INC | 3- 5 | 3 1/8 | - 7/8 | -21.8 |
| N | DPF INC | 8- 14 | 10 | -1 3/8 | -13.9 |
| N | ITEL | 10- 36 | 26 | - 3/4 | -2.8 |
| N | LEASCO CORP | 24- 36 | 33 1/4 | - 1/8 | -0.3 |
| O | LEASPAC CORP | 1- 4 | 2 1/2 | - 1/4 | -9.0 |
| A | PIONEER TEX CORP | 3- 7 | 3 3/4 | - 3/8 | -9.0 |
| N | U.S. LEASING | 13- 29 | 14 | -1 3/4 | -11.1 |

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EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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### SOFTWARE & EDP SERVICES

| EXCH | | 1978 RANGE (1) | CLOSE NOV 1 1978 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| O | ADVANCED COMP TECH | 1- 2 | 1 | - 1/8 | -11.1 |
| O | ANACOMP INC | 8- 22 | 12 1/8 | +1 1/8 | -8.4 |
| A | APPLIED DATA RES. | 8- 17 | 10 1/4 | -1 | -8.8 |
| N | AUTOMATIC DATA PROC | 24- 36 | 30 3/4 | +2 | +6.9 |
| 9 | COLEMAN AMERICAN COS | 1- 2 | 1 1/4 | - 1/8 | -9.0 |
| O | COMPU-SERV NETWORK | 6- 12 | 6 3/4 | -1 1/2 | -18.1 |
| O | COMPUTER HORIZONS | 1- 9 | 5 1/2 | -1 1/2 | -21.4 |
| 9 | COMPUTER NETWORK | 7- 16 | 7 3/4 | - 3/4 | -8.8 |
| N | COMPUTER SCIENCES | 8- 17 | 11 1/4 | -1 1/4 | -10.0 |
| O | COMPUTER TASK GROUP | 1- 4 | 3 3/4 | 0 | 0.9 |
| O | COMPUTER USAGE | 2- 4 | 2 1/2 | - 1/2 | -16.6 |
| O | COMSHARE | 6- 19 | 13 3/4 | - 1/2 | -3.5 |
| O | CULLINANE CORP | 17- 33 | 17 3/4 | -2 | -10.1 |
| O | DATA DIMENSIONS INC | 4- 9 | 4 3/4 | -1 5/8 | -25.4 |
| O | DATATAB | 1- 2 | 1 | - 1/8 | -11.1 |
| N | ELECTRONIC DATA SYS. | 15- 23 | 18 1/2 | + 1/4 | +1.3 |
| O | INSYTE CORP | 1- 3 | 3/4 | - 3/8 | -33.3 |
| O | TPS COMPUTER MARKET. | 2- 3 | 3 | 0 | 0.9 |
| O | KEANE ASSOCIATES | 3- 6 | 4 5/8 | + 1/8 | +2.7 |
| O | KEYDATA CORP | 1- 3 | 2 | - 1/8 | -5.8 |
| A | LOGICON | 11- 19 | 11 7/8 | - 3/8 | -3.9 |
| O | MANAGEMENT DATA | 1- 2 | 1/8 | 0 | 0.0 |
| A | NATIONAL CSS INC | 15- 36 | 24 | 0 | 0.0 |
| O | NATIONAL DATA CORP | 7- 13 | 8 3/8 | - 5/8 | -6.9 |
| A | ON LINE SYSTEMS INC | 16- 30 | 17 | -2 3/4 | -13.9 |
| N | PLANNING RESEARCH | 4- 19 | 6 3/4 | - 1/8 | -1.8 |
| O | PROGRAMMING & SYS | 1- 1 | 1 3/8 | - 1/8 | -8.3 |
| O | RAPIDATA INC | 3- 7 | 4 1/4 | - 3/8 | -8.1 |
| O | REYNOLDS & REYNOLD | 18- 36 | 27 1/4 | - 1/2 | -1.8 |
| O | SCIENTIFIC COMPUTERS | 3- 9 | 6 1/4 | - 7/8 | -12.2 |
| O | TYMSHARE INC | 18- 33 | 24 | - 3/8 | -1.5 |
| A | URS SYSTEMS | 5- 8 | 3 5/8 | - 1/4 | -4.2 |
| N | WYLY CORP | 1- 7 | 4 3/8 | - 5/8 | -12.5 |

### PERIPHERALS & SUBSYSTEMS

| EXCH | | 1978 RANGE (1) | CLOSE NOV 1 1978 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| N | ADDRESSOGRAPH-MULT | 14- 32 | 23 1/8 | +1 1/4 | +5.7 |
| 9 | ADVANCED MEMORY SYS | 7- 18 | 12 7/8 | - 1/4 | -1.9 |
| N | AMPEX CORP | 10- 19 | 12 5/8 | -1 1/4 | -9.0 |
| O | ANDERSON JACOBSON | 5- 10 | 3 1/2 | - 1/4 | -4.3 |
| N | APPLIED DIG DATA SYS | 9- 22 | 10 1/2 | - 7/8 | -7.6 |
| O | BEEHIVE INT'L | 4- 7 | 3 7/8 | - 3/4 | -16.2 |
| A | BOLT.BERANEK & NEW | 6- 14 | 9 1/2 | 0 | 0.0 |
| N | BUNKER-RAMO | 10- 20 | 12 7/8 | -1 7/8 | -12.7 |
| A | CALCOMP | 3- 13 | 5 3/4 | -1 3/4 | -23.3 |
| O | CAMBRIDGE MEMORIES | 3- 9 | 4 3/8 | -1 1/4 | -22.2 |
| N | CENTRONICS DATA COMP | 16- 37 | 23 | -3 3/8 | -12.7 |
| O | COGNITRONICS | 1- 4 | 1 1/4 | - 3/4 | -37.5 |
| O | COMPUTER COMMUN. | 6- 12 | 6 5/8 | - 1/8 | -1.8 |
| O | COMPUTER CONSOLES | 4- 10 | 6 1/2 | - 3/4 | -10.3 |
| A | COMPUTER EQUIPMENT | 3- 6 | 3 3/4 | - 7/8 | -18.9 |
| O | COMPUTER TRANSCEIVER | 1- 3 | 2 3/8 | - 3/8 | -29.8 |
| O | CONTEN | 9- 38 | 23 3/4 | -1 3/4 | -6.8 |
| N | CONRAC CORP | 15- 26 | 15 1/4 | -2 7/8 | -13.8 |
| O | DATA ACCESS SYSTEMS | 3- 14 | 11 | 0 | 0.0 |
| O | DATA 100 | 9- 20 | 19 1/8 | - 1/8 | -0.6 |
| A | DATA PRODUCTS CORP | 14- 25 | 16 1/4 | - 1/8 | -0.7 |
| O | DATUM INC | 2- 6 | 2 7/8 | - 1/2 | -14.8 |
| O | DECISION DATA COMPUT | 2- 6 | 2 7/8 | - 1/4 | -8.0 |
| O | DELTA DATA SYSTEMS | 1- 4 | 1 5/8 | + 3/8 | +30.0 |
| A | DOCUMATION INC | 6- 34 | 19 1/4 | -2 7/8 | -12.9 |
| O | DATARAM CORP | 6- 32 | 20 | -3 1/2 | -14.8 |
| N | ELECTRONIC M & M | 4- 9 | 4 7/8 | - 1/2 | -9.3 |
| O | FABRI-TEK | 1- 2 | 1 1/8 | 0 | 0.0 |
| O | GENERAL COMPUTER SYS | 1- 3 | 1 1/2 | - 1/4 | -14.2 |
| N | HAZELTINE CORP | 19- 17 | 12 | - 5/8 | -4.9 |
| N | HARRIS CORP | 17- 36 | 32 3/8 | +1 7/8 | +6.1 |
| O | INFOREX INC | 6- 11 | 6 3/8 | -1 1/2 | -19.0 |
| O | INFORMATION INTL INC | 7- 12 | 7 1/2 | -1 1/2 | -16.6 |
| O | INTEL CORP | 39- 62 | 48 1/2 | - 1/2 | -1.0 |
| A | LUNDY ELECTRONICS | 4- 8 | 5 | - 3/8 | -6.9 |
| O | MSI DATA CORP | 10- 19 | 12 1/8 | - 1/8 | -1.0 |
| N | MEMOREX | 27- 39 | 32 1/4 | +1 1/4 | +4.0 |
| N | MOHAWK DATA SCI | 6- 15 | 8 1/8 | - 1/2 | -5.7 |
| O | OMEX | 2- 6 | 5 1/2 | 0 | 0.0 |
| O | PENRIL CORP | 5- 12 | 10 | - 1/2 | -4.7 |
| N | PERTEC CORP | 9- 17 | 10 3/4 | - 7/8 | -7.5 |
| A | POTTER INSTRUMENT | 2- 2 | 1 3/4 | 0 | 0.0 |
| O | QUANTOR CORP | 2- 5 | 2 5/8 | + 1/8 | +5.0 |
| O | RECOGNITION EQUIP | 7- 13 | 7 | -1 3/4 | -20.0 |
| O | SCAN DATA | 1- 5 | 2 1/8 | - 1/4 | -12.8 |
| N | STORAGE TECHNOLOGY | 19- 46 | 26 | + 1/2 | +1.9 |
| O | T BAR INC | 11- 20 | 15 1/4 | - 1/4 | -1.6 |
| O | TALLY CORP. | 4- 9 | 5 1/8 | - 1/4 | -4.6 |
| A | TEC INC | 6- 13 | 7 1/4 | -1 1/4 | -14.7 |
| N | TEKTRONIX INC | 33- 30 | 42 3/8 | - 3/8 | -1.4 |
| N | TELEX | 3- 9 | 5 5/8 | - 1/8 | -2.1 |
| O | TESDATA SYSTEMS CP | 9- 23 | 9 3/4 | - 3/4 | -7.1 |
| O | WILTEK INC | 1- 2 | 1 1/8 | - 3/8 | -25.0 |

### SUPPLIES & ACCESSORIES

| EXCH | | 1978 RANGE (1) | CLOSE NOV 1 1978 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| A | AMERICAN BUS PRODS | 6- 11 | 7 7/8 | - 1/8 | -1.5 |
| 9 | BALTIMORE BUS FORMS | 2- 4 | 1 | 0 | 0.0 |
| A | BARRY WRIGHT | 14- 30 | 22 3/4 | -1 3/4 | -7.1 |
| O | CYBERMATICS INC | 1- 1 | 5/8 | 0 | 0.0 |
| O | DUPLEX PRODUCTS INC | 13- 30 | 14 1/4 | -1 1/4 | -8.0 |
| N | ENNIS BUS. FORMS | 8- 17 | 11 1/2 | + 3/8 | +5.7 |
| N | 3M COMPANY | 43- 66 | 59 7/8 | +1 7/8 | +3.2 |
| O | MOORE CORP LTD | 26- 34 | 29 1/2 | 0 | 0.0 |
| N | NASHUA CORP | 18- 37 | 25 1/2 | -1 3/8 | -5.1 |
| O | STANDARD REGISTER | 20- 27 | 20 1/2 | -1 1/2 | -6.8 |
| A | TAB PRODUCTS CO | 8- 16 | 9 3/4 | -1 3/4 | -15.2 |
| N | UARCO | 19- 34 | 33 3/4 | +3 3/4 | +12.3 |
| A | WABASH MAGNETICS | 10- 22 | 15 3/8 | - 3/8 | -2.3 |
| N | WALLACE BUS FORMS | 18- 33 | 23 5/8 | -2 3/8 | -9.1 |

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